An Evaluation of Clinician Perception of a Novel Lifestyle Change Prescription Form (LRx) in Wales, UK.

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Abstract

Introduction: This is the first study conducted in Wales, UK to evaluate the usefulness of a lifestyle prescription form (LRx) for use by prescribing clinicians in both the primary and secondary health care settings in the Cwm Taf University Health Board, Wales, UK and to gauge clinician opinion on the use of such a novel material tool.

Objective: To establish the views of clinicians on the feasibility and effectiveness of using a novel lifestyle prescription form (LRx) requiring co-signing by clinician and patient and uniquely based on the design of the standard drug prescription form used in primary and secondary care settings in the United Kingdom.

Methods: Thirty-seven participants were recruited with 1 drop out. Thirty-six participants, 18 doctors (12 secondary care of varying specialties and 6 general practitioners), 15 nurses, and 3 general practice healthcare assistants, were each issued with an LRx prescription pad (each pad containing 20 sheets) and asked to prescribe each LRx to suitable patients during consultation and log the reason for LRx issue. Each clinician was then asked to complete a feedback questionnaire.

Results: Forty percent (196 of 480) of the LRx scripts that were provided to primary and secondary care clinicians during the study period were issued (age (mean) 56 years, range 35-75 years). In most consultations the LRx was prescribed for dietary advice, 69 and 62% in primary and secondary care respectively. Mostly, the LRx was prescribed as an adjunct to prescribing medication (43%) and in response to request for advice from the patient (40%). Nurses were more likely to prescribe an LRx in response to a request for advice from a patient. In secondary care, more LRx were prescribed to males than females ($p = 0.017$). Doctors reported lack of time as a main barrier to using the LRx and were more likely to report this than nurses.

Discussion: An LRx is a useful addition in the clinical setting prompting clinicians to give lifestyle advice to patients who require lifestyle changes to improve their health. An LRx is a method of distributing lifestyle advice that clinicians would utilise, given sufficient time. The main barrier to use experienced in the study was lack of time, this may be due to the LRx being a novel tool. Issuing the LRx prescription is a method of confirming lifestyle advice that clinicians could utilise, particularly with sufficient consultation time.

Conclusion: The LRx is a useful addition to the clinician's communication toolkit to stimulate lifestyle behaviour changes in their patients, to help improve their cardiovascular health.

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Acknowledgments

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Abbreviations

LRx or LRx	Lifestyle prescription
PC	Primary care
SC	Secondary care
CTUHB	Cwm Taf University Health Board
CV(D)	Cardiovascular (Disease)
GP(s)	General practitioner(s)
NP	Nurse practitioner
MECC	Making every consultation count
COM B	Capability; opportunity; motivation; behaviour
BCT	Behaviour change technique
MI	Motivational interviewing
TTM	Transtheoretical model
HBM	Health belief model
MHBC	Multiple health behaviour change
GRx	Green prescription
P-PLAC	Primary Prescribing lifestyle adjustments for cardiovascular health study
S-PLAC	Secondary Prescribing lifestyle adjustments for cardiovascular health study

Outline

The dissertation will be organised in chapters as indicated below;

Chapter 1: Introduction

Introduces and briefly defines the topic and background, providing an overview of the research.

Chapter 2: Literature Review

Due to the very interdisciplinary nature of this topic and where it sits within the academic filed, as well as the novel aspect of a bona fide lifestyle prescription, a very broad scoping literature review was conducted which aimed to ascertain how behaviour change in currently instigated in practice, by whom and when and if 'prescribing advice' would be a useful addition to the behaviour change arsenal. This helped to draw conclusions about existing research and the possible areas for future research.

Chapter 3: Research Methods

Outlines the overall research methods used to select participants, develop a reliable survey and collect and analyse data.

Chapter 4: Results

The results from the surveys are presented.

Chapter 5: Discussion

Discusses the overall outcomes from the research and how the LRx was perceived and used by clinicians. Comparisons are made between primary and secondary care use as well as between doctors and nurses/other healthcare professionals followed by a discussion on the significance and implications of the study. This chapter summarises key findings and provides concluding statements for the dissertation.

Chapter 6: Conclusion

Concludes the research overall.

Chapter 7: Future Direction

Discusses the possible future direction for the development and use of the LR.

Chapter 8: References

Lists the references of the citations in this document

Chapter 9: Appendix

Contains documents created and used in the study.

1.0 Introduction

The health of any animal is determined by its genetics, its environment and its behaviour, which is also highly determined by the environment. Humans are no different in this regard to any other animal (Harari, 2014). However, a key factor which influences human health and is especially pertinent in the modern world is the human habitat and its impact on the decisions which humans make which in turn effects their health (Kahneman, 2011; Plomin, 1990).

The science of genetics is inherently complicated and genetic research is expensive as well as time consuming. Furthermore, the realities of current science mean that humans still have limited control over their own genetics even with the large amounts of money which have been invested in genetic, epigenetics and pharmaceutical research (Taylor, Smith, Relton, Gaunt, & Richardson, 2018).

The environment, however, is shaped by human kind (with the exception of the weather). It is well established that changing environmental conditions of most sorts has a knock on effect on human health in either a positive or negative direction (Haines, Kovats, Campbell-Lendrum, & Corvalan, 2006).

On many metrics the advent of industry and thus the modern world has served human kind well, enabling us to grow to a species more than 7 billion strong. However, measured in other ways the modern world has caused many problems which can be attributed to a mismatch between human genetics and development and the current conditions in which we live (Lieberman, 2015).

The recent changes in the human environment have enabled great strides in longevity by reducing the rates of infectious disease but have given rise to ‘diseases of affluence’ predominantly due to lack of physical activity, unhealthy diets, cigarette smoking and excessive alcohol consumption (Marmot, Adelstein, Robinson, & Rose, 1978).

These four health harming behaviours are significant in their ability to increase the rate of morbidity in a population and are villainous in their mechanism of action due to the slow rate of disease progression. Health harming behaviours are highly effective at increasing disability adjusted life years, increasing mortality and shortening the life of an individual. Furthermore, they are completely avoidable yet insidious in their propensity to overwhelm large amounts of a population (Balogh, Papp, Jozan, & Csaszar, 2010).

The prevalence of health harming behaviours amongst a group of people correlates with the other environmental and socioeconomic factors in which the group exists (Prochaska &

Velicer, 1997). It is well established that rates of smoking are higher amongst unemployed people and people of lower socioeconomic status, likewise for the other three important health harming behaviours. Furthermore, harmful behaviours tend to co-exist, such as smoking as well as drinking alcohol or not partaking in physical activity and eating an unhealthy diet (Akesson, Weismayer, Newby, & Wolk, 2007). It is apparent then that a single health harming behaviour can be a confounding factor for the existence of other health harming behaviours.

These four health harming behaviours are by some estimates responsible for up to 90% of all avoidable chronic disease. The very nature of chronic disease means that it is incurable and is only manageable with modern medicine (McGill, McMahan, & Gidding, 2008). Nevertheless, research has shown that changing health harming behaviours and engaging in health promoting behaviours is effective at reducing the chances of having chronic disease as well as improving the prognosis for patients with chronic disease (Berenguera et al., 2017). In Wales, UK, where this research was conducted, cardiovascular disease is the leading cause of mortality with 30% of all deaths attributable to the disease (Dixon & Roberts, 2016).

It is clear then that the contemporary lifestyle of modern man differs drastically from that of our ancestors and this difference is particularly apparent in modern western society which has seen the greatest amount of environmental change due to industrial and technological development leading to profound changes in human behaviour which in turn influences disease risk factors attributable to lifestyle (Harari, 2014).

Given this knowledge of the detrimental nature of health harming behaviours, it has become apparent in recent years that it is necessary for public health to promote healthy behaviour as well as restrict the use of health harming substances such as cigarettes and alcohol by legal means and taxation (Shroufi et al., 2013). Changing physical activity and dietary behaviour is more difficult. Attaining a good level of physical activity is seen by many as challenging due to the nature of modern work and its mostly sedentary basis. Changing diet is also viewed as challenging and may depend on the environmental context of each individual and their knowledge and prior customs of eating. Nevertheless, the modern food industry has played a huge role in changing people's diets since the end of World War 2 and this has had mostly detrimental effects in terms of diversity of nutritional quality (Nesheim et al., 2015). There have been numerous interventions and incentives designed and implemented by policy makers and Public Health groups to improve the health of the nation. Some of these policies have greater effect than others (Kelly & Barker, 2016).

Social prescribing has gained a greater interest in recent years as a means of improving health in communities, particularly in the mental health arena. Furthermore, patients have a long-standing respect for prescription forms issued by a prescribing clinician and are also used to

using them. Due to these facts of prescribing, the concept of prescribing lifestyle advice for multiple health harming behaviours and also signposting patients to relevant help services was born (Brandling & House, 2009).

This dissertation outlines the evidence that exists for prescriptive lifestyle changes and their usefulness in changing behaviour to initiate healthier lifestyles and thus improve health outcomes. Importantly, this dissertation explores the clinician side of the behaviour change method by assessing how clinicians feel about giving advice to instigate behaviour change and how they feel about giving advice in a prescriptive manner in particular. This dissertation examines the usefulness of what is, in essence, prescribing advice to patients with a material tool in the hope that it instigates change.

The main objective of the research outlined in this dissertation was to investigate clinicians' perceptions of a novel 'lifestyle prescription' commissioned and developed by Public Health Wales with advice from numerous stakeholders in the health arena. The Lifestyle Prescription form (LRx) was a script designed in the image of a standard prescription form and was designed to be used by any medical practitioner. The LRx was created with the aim of instigating a behaviour change conversation by the medical practitioner with the patient and to provide the patient with consistent, concise and appropriate information regarding the most common health harming behaviours. The LRx was designed to be a useful script in the fight to address health inequalities that exist in Wales, which strongly correlate with health harming behaviours, and which are particularly prevalent in the health board in which this research was conducted.

2.0 Literature Review

2.1 Purpose and Scope

This literature review is being conducted as the initial component for a research project with the title ‘Prescribing behaviour change for cardiovascular health’.

The review has the objective of assessing the methods by which a behaviour change conversation or ‘intervention’ is instigated into a patient plan of healthcare in the primary care and secondary care arena whilst determining from the literature where and how a lifestyle prescription will fit.

The predominant targets of assessment being how the behaviour change conversation, leading to a process, is attempted in the healthcare setting, by which type of practitioner it is most frequently delivered, and what is being conveyed in the conversation.

The review aims to determine if there is evidence for the use of behaviour change materials in the initiation of a behaviour change conversation between a healthcare practitioner and the patient.

The literature review considered research from the public health and clinical medicine disciplines as well as a significant amount of literature from the field of psychology, most crucially behaviour change mechanisms and methodologies.

2.2 Search Strategy

To conduct this literature review the following databases were searched: CINAHL plus, MedLine, PubMed, PsychINFO using a search strategy planner developed by Public Health Wales (figure 1). Reference lists of relevant articles were also searched. Key terms including 'behaviour change', 'cardiovascular health', 'primary care', 'behavioural interventions', 'patients' and related synonyms of each term were used in the advanced search function of the databases using query strings and MeSH headings were used in Pubmed.

A search strategy planner was used to help guide the literature search for this report (Figure 1).

Search strategy planner

Identify type of question/problem and create focussed question. [On completion, compare with PICO, ECLIPSE, SPICE]				
What is the evidence for prescription led behaviour change for managing cardiovascular health in primary care?				
Identify/ separate the main concepts of the question for subject/keywords.				
Behaviour change	**prescription**	**Cardiovascular health**	**Primary care**	**Patients**
Include alternatives for keywords				
Synonyms, related terms **Behaviour modification** **Behaviour adjustment** **Lifestyle change** **Lifestyle adjustment** **Lifestyle modification**	**Synonyms, related terms** **Prescription led**	**Synonyms, related terms** **Cardiovascular disease**	**Synonyms, related terms** **General practice** **GP** **Practice nurse** **Nurse practitioner** **Primary/secondary healthcare** **Primary/ secondary healthcare personnel** **Family care practitioner** **Consultant clinician**	**Synonyms, related terms** **Patient knowledge** **Attitude**
Limitations				
Date- got rid of limit as I have narrowed down my search terms so well that not many results were coming back **English language**				
Sources				
• CINAHL Plus- very good (got at least 14) • Scopus- turned out to be useless • Cochrane Library- useless				

Figure 1. Search strategy planner used to perform literature searches to conduct literature review

2.3 Cardiovascular disease

Cardiovascular disease (CVD) is a catch-all term for a multitude of linked pathologies including coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic and congenital heart diseases and venous thromboembolism (Masana et al., 2017). CVD remains the leading cause of death in the United Kingdom and globally despite decades of research and development to target the disease. In 2014, 28% of male and 26% of female mortality of all ages was attributable to cardiovascular disease, according to the British Heart Foundation statistics compendium 2015 (Townsend, Wickramasinghe, Williams, Bhatnagar, & Rayner, 2015). In Wales, CVD accounts for around a third of all mortality and costs the National Health Service (NHS) and the UK economy £30 billion annually (The Welsh Government, 2017a). In 2010/2011, there were 1.4million CVD-related hospital admissions, of which 60% were for people younger than 75 and more than half as an emergency (Hill et al., 2013).

It is well documented that behavioural choices are associated with an increased preponderance to developing CVD - major contributing behaviours being; cigarette smoking, not performing enough physical activity, eating an unhealthy diet lacking nutritional quality but with excessive calories and consuming excessive amounts of alcohol. These are 4 of the greatest behavioural contributors to CVD in the western world, especially in the UK and importantly in Wales with up to 90% of all CV mortality linked to these health harming behaviours (Khaw et al., 2008; Yusuf et al., 2004).

Knowledge of risk is essential for the adoption of healthy lifestyle behaviours related to diet, exercise, smoking and alcohol consumption. Critically, up to 40% of the general population underestimate their CVD risk. False reassurance may lead to adoption and/or maintenance of unhealthy behaviours contributing to the premature onset of CVD. Lower CVD risk awareness is reported among men, inner city residents and people of lower socioeconomic status (Hill *et al.* 2013).

The INTERHEART study provided a good illumination of the main CVD risk factors. Notably, it was shown that healthy behaviours were effective at preventing CVD across the socioeconomic strata. It was found that health harming behaviours tend to co-exist to the same extent that health promoting behaviours do. It is also known that although age is said to be a risk factor for the development of CVD, evidence suggests that age isn't a determinant of CVD, growing older does not guarantee developing CVD. Therefore, behavioural changes that reduce health harming behaviours are crucial for preventing CVD regardless of socioeconomic background or other social and environmental fact (Yusuf et al., 2004).

There is a wealth of scientific evidence that demonstrates the relevance of a healthy lifestyle (the lack of health harming behaviours) for the aetiology of CVD (Chomistek et al., 2015; Iso, 2011; Masana et al., 2017; Rautio et al., 2015). Crucially, progression of cardiovascular disease may be ablated by changes in lifestyle.

2.4 The healthcare setting

Primary care (PC) is ordinarily the first point of contact for health matters for the public. Primary care is provided by general practitioners (GPs) and also by nurse practitioners (NPs), as well as community pharmacists, opticians and dentists. Each of these practitioners is equally responsible for 'making every consultation count' (MECC) (Percival, 2014) and therefore responsible for asking patients about their lifestyle and health harming behaviours.

The predominant aim of primary care is to provide people with an easily accessible health service that enables continuity of care and follow up appointments. Primary care exists to care for people, rather than targeting interventions for specific diseases which are normally dealt with by a specialist consultant. This means that primary care healthcare professionals are generalists and 'holistic' in their approach to physical, psychological or social problems (Jallinoja et al., 2007).

Primary care practitioners are in the important and unique position to promote harm reducing behaviours and behavioural changes to patients at risk of CVD or with existing symptoms of CVD, in the local community. On average, people visit their general practitioner or local health clinic 5.4 times per person per annum, with over 80% of the UK population consulting with general practice annually (Butler et al., 2013). This puts primary care truly at the tip of the spear for initiating lifestyle change interventions to the population. Primary care practitioners are therefore crucial to the task of reducing health harming behaviours in the population by MECC and intervening when appropriate with referrals and importantly brief interventions in consultations (Haller, Pfarrwaller, Cerutti, & Gaspoz, 2016).

Clearly, all of the available evidence points to the promotion of risk reduction strategies and instigating conversation around behaviour change at every available opportunity in the healthcare setting. Promoting good CV health has myriad benefits for society and the economy, not least lower prevalence of morbidity and increased wellbeing but also reduced costs to the health service.

The challenge, however, is extraordinarily large due to the complexity of human behaviour and habit and the role of the environment in human decision making (Hill et al., 2013).

2.5 Behaviour

Human behaviour is determined by genetic, social, environmental and cultural factors, amongst other influences. Behaviours determine the actions people make and the responses they have to all stimuli. Behaviours are controlled by both the nervous system and the endocrine system; it is known that the more complex an animal's nervous system, the more complex their behaviours tend to be due to the ability to learn and adapt to stimuli from the environment over time (Davis, Campbell, Hildon, Hobbs, & Michie, 2015).

Behaviour is impacted by each individual's personality traits and temperament but is heavily influenced by the environment and context of any given situation which a person finds themselves in. Behaviours can change over a lifetime as context changes, health changes, mental acuity changes and many other factors both internally and externally. Therefore, it is clear that this area of psychology is broad, incredibly complex and completely intertwined with many other academic fields including anthropology, evolutionary biology, sociology, philosophy, theology and numerous others (Bandura, 1999). Societal norms also largely influence behaviour, these are cultural influences. Culture is the driving force of modern human development. In recent millennia culture has taken over from biological influences to drive human evolution and progress. The ideological or 'political' zeitgeist has been an especially strong force for change well illustrated in the stark contrasts of the 1960s Soviet Union and United States. These environments directly determine the behaviour of the human and therefore its health.

For the purpose of this literature review, human behaviour can be thought of as; 'the product of individual or collective human actions, seen within and influenced by their structural, social and economic context' (National Institute for Health and Care Excellence, 2007) or as 'anything a person does in response to internal or external events'. This definition is agreed across multiple disciplines including psychology, sociology, anthropology and economics. Actions may be tangible and intangible and overt or covert (Chauhan et al., 2017).

It is because of the complexity of human behaviour due to internal and external stimuli that developing behaviour change policy, techniques or interventions and shaping the choices which people make is so difficult.

2.6 Behaviour change

Behaviour change is a distinct area of behavioural psychology and involves the use of theories to develop interventions to change human behaviour. Behaviour change is utilised in different fields of research and policy including health, environment, education and government amongst others, all with the same goals of promoting better behaviour than the current behaviours which may be detrimental to health or harmful to the environment or other people in myriad ways (Masana et al., 2017).

It is necessary to have an understanding and a definition as to what constitutes behaviour *change* to develop appropriate and effective interventions. This entails being aware of the theoretical underpinnings of behaviour change. In the context of behavioural psychology, theories are the accumulated knowledge of the mechanisms of action and moderators of change and also the underlying understanding and assumptions of what human behaviour is and entails (Michie, van Stralen, & West, 2011). Research indicates that behaviour can be effectively modified through interventions that target behaviours with specificity and precision, especially in the short term. However, long term sustainability of behavioural change from multiple interventions is less well established (Artinian et al., 2010). There is less evidence for long term effectiveness of behaviour change interventions and long-term interventions have been less evaluated with fewer studies looking into the effects of interventions over the course of several years as opposed to a number of months. It seems apparent that the effects of behavioural interventions, even those backed by a theory of behavioural change, can diminish over time as people revert back to old habits or old methods of action indicative of the hard-wired nature of certain behaviours, especially those that are health related (Kwasnicka, Dombrowski, White, & Sniehotta, 2016; Ryan & Deci, 2000).

When dealing with health-related behaviour change it is even more imperative to be aware of the nature of certain behavioural ‘choices’ and the insidious nature of addiction (Katikireddi, Green, Taylor, Smith, & Munafò, 2017). Not only this but due to the nature of our society and its foundations of consumerism and strong marketing strategies, it is far easier to revert back to drinking alcohol, smoking and eating an unhealthy diet or not exercising than it is to stick to a new behaviour which has not yet reached the stage of ‘maintenance’ in the stages of change model (Norcross, Krebs, & Prochaska, 2011). Reaching the maintenance stage can require many years of continued dedication to a new behaviour, all the while the person trying to change is most likely living in the same environment since they tried to change, is spending time doing the same things and is influenced by the same people in the same context (Miller & Rollnick, 2004). Therefore, there is much stacked up against an individual trying to change

their behaviour, no matter the theory behind the intervention!

It is important to understand the mechanisms of action that enable some behaviour change strategies to 'stick' and therefore be effective in the long term to design interventions and strategies which are cost effective and beneficial rather than wasting time, money and resources designing and implementing interventions which only have a short-term effect. Not to mention the ethical considerations of giving patients behaviour change interventions which do not provide long term health advantage but also potentially cause a disadvantage in the short term as the patient must undergo the stages of change which can be disruptive and stressful.

2.7 Behaviour change theory

In the psychological literature, theory is defined as a set of statements that organises, predicts and explains observations. Theory explains how phenomena relate to each other, and what can be expected under unknown conditions (Michie & van Stralen *et al.* 2011). Theory may be useful for research to improve our understanding of maintained behaviour as well as for the design and implementation of interventions to achieve behaviour change maintenance (Johnson & May, 2015). A theory is a set of interrelated concepts, definitions, and propositions that explains or predicts events or situations by specifying relations among variables. Health behaviour theories reflect an amalgamation of approaches, methods, and strategies from social and health sciences (Davis et al., 2015).

Health behaviour change theories, including the Integrated Theory of Health Behaviour Change, are general which enables them to have a broad application and are therefore useful in numerous different interventions by not being overly specific for any one single intervention. For example, the stages of change theory may be applied to interventions which target smoking cessation or physical activity promotion. Each theory utilises specific vocabulary to delineate differences between terms and concepts and thus articulate the specificities of that theory (Johnson & May, 2015).

Behaviour change theories may be explanatory, change theory or both. Explanatory theory enables understanding of why behaviours are performed and change theory enables interventions to be developed to change the behaviour. Often behaviour change theories are both. Theory enables understanding of why people do or do not practice health promoting behaviours or health harming behaviours. Theories also enable the identification of what is needed to develop successful intervention strategies targeting specific groups or populations. Explanatory and change theory require an understanding of the social determinants of health

and behaviour. This is because behaviour is determined by environmental, economic, social, cultural and individual factors. Therefore, interventions are more likely to be effective when the multitude of contributing factors to a behaviour are taken into account. Interventions should not only be targeted at individuals but should also affect interpersonal, organisational, and environmental factors influencing health behaviour (Michie, Johnston, Francis, Hardeman, & Eccles, 2008).

There is consensus in the behaviour change community of researchers and practitioners that basing interventions on behaviour change theory is more scientifically rigorous and provides greater effectiveness of intervention design and outcome (Michie et al., 2013). Nevertheless, there is conflicting literature regarding whether or not utilising theory when developing behaviour change interventions is more effective or not. One review has found positive effects (Albada, Ausems, Bensing, & van Dulmen, 2009) for the use of theory in developing interventions whereas another has not (Gardner, Wardle, Poston, & Croker, 2011).

Nevertheless, theory can be developed and is able to be evaluated and makes interventions easier to evaluate in a more logical manner. Theory based interventions enable the development of the intervention by facilitating an understanding of what works and does not work which enables specific development of theory across different contexts, populations and behaviours. It also enables interventions to be more malleable to different socio-economic contexts (Bandura, 1999).

Behaviour change techniques (BCT) are the active ingredients to any intervention delivered to a patient in a healthcare setting. A behaviour change technique can be defined as an "observable, replicable and irreducible component of an intervention designed to alter or redirect causal processes that regulate behaviour" (Michie *et al.* 2013). In this fashion, the BCT is the part of the intervention which is key to initiating the behavioural change and can be monitored.

To allow the accurate assessment of any given BCT used in a healthcare setting it is necessary to understand what the active components of the BCT are. Without a classification system, it is impossible to accurately replicate a BCT and therefore difficult to inform its development (Michie *et al.* 2008). Underspecified BCTs are not able to be replicated and delivered with fidelity. In addition, many interventions are conducted without any underlying scientific theory thus it is difficult to accurately pin point the type of BCT which is being used in an intervention and with what justification and to what end.

Delivering behaviour change in health care must involve the use of communication between the practitioner and the patient. Effective communication is necessary to enable the patient to

understand their behaviours effects on their own health and for the patient to deem change as beneficial. BCTs are used by practitioners to communicate effectively to patients to initiate specific behavioural changes.

2.8 Health behaviour change leads to positive health outcomes

It is well established that changing key health behaviours including smoking cessation, reducing alcohol consumption, eating a diet high in vegetables and fruit and reducing sedentary time leads to vastly improved health outcomes including fewer disability adjusted life years and reduced all-cause mortality (Cassidy, 2015; Chomistek et al., 2015; Masana et al., 2017; Rautio et al., 2015; P. Ryan, 2009).

These measures are best instigated to prevent the onset of chronic disease from taking place but are also effective at improving health outcomes for those that have chronic disease symptoms too (Brodie & Inoue, 2005).

This fact is the fundamental basis for the need and public health drive to create effective health promotion initiatives, interventions and resources that engage people to make proactive and positive steps for their health by attenuating health harming behaviours. To ‘change’ people – for the betterment of their health.

The EPIC Norfolk study found a strong link between an increase of positive health behaviours and reduced all-cause mortality. The prospective study examined 20,244 men and women aged 45-79 years who had no known CVD or cancer at baseline and followed up this group 11 years later in 2006. This study indicated that the effect of engaging in positive health behaviours is additive. The more positive health behaviours participants in the study engaged in, the better their health and reduced mortality (Khaw et al., 2008).

A systematic review found that health behaviours also have a clustering effect. Engaging in one healthy behaviour means a person is more likely to engage in another healthy behaviour and vice versa for health harming behaviours (Meader et al., 2016) This systematic review provided evidence for the use of multiple health harming behaviour change interventions to improve all round health, by targeting health behaviours sequentially or concurrently where there is evidence of health harming behaviour clustering – often present in people who smoke and drink alcohol.

2.9 Self Efficacy Theory

Self-efficacy is an individual's capacity to follow through with their goals and plans as related to their personal believes and feelings of self-worth (Bandura, 1999).

Health behaviour choices have a strong link to an individual's self-efficacy. Those high in self-efficacy make better health choices than those low in self-efficacy (Dr, Scholz, & Schwarzer, 2005).

Self-efficacy theory is a useful theory to consider in the design, implementation and use of the LRx due to the use of the LRx being a self-directed by the patient in an autonomous manner. Although the LRx is prescribed by a clinician, the ownership of the instructions falls solely on the patient and thus how well followed the instructions of the LRx are depends highly on the patient's self-efficacy.

Taking this theory into account, the LRx was designed with prompts for the patient to contact services that are able to help with their behaviour change. Nevertheless, if the patient is very low in self-efficacy it may difficult for them to follow instructions given by a clinician, even if these instructions are given in a prescriptive format.

2.10 COM-B

For behaviour change to take place it is necessary that the individual has prerequisites in place to enable the change, which include the skills necessary to perform the change, the intention to change and the environmental capacity without undue hindrance. The COM-B model of behaviour change (Figure 2) is a framework and theory that stands for capability, opportunity and motivation. These 3 components of the model are said

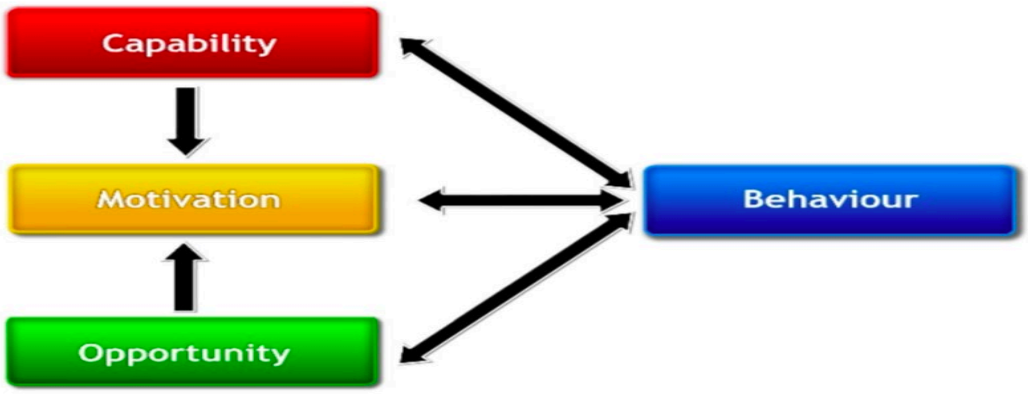

Figure 2. The COM – B Model illustrating the interactions and influences of opportunity, personal motivation and personal capability on a person's behaviour.

to interact with each other and explain why behaviour sticks or changes in each circumstance or context (Fishbein, Triandis, Kanfer, Becker, & Middlestadt, 2000).

Change requires volition, known colloquially as 'willpower', which is a fundamental human cognitive process by which an individual decides upon pursuing a specific course of action or objective and carries out the necessary undertaking; purposeful striving. Michie et al (2011) also proposed that behaviour change could be looked at in the same view that the US criminal justice system assess a person as being guilty of a crime. These factors include a person having means or capability, opportunity and motive. These factors are not only necessary to commit a crime, but also necessary for one to engage in any volitional behaviour, including change.

Capability, in both psychological and physical terms, is the capacity an individual has to engage in any given activity by having the necessary knowledge and skillset that are required. Motivation is a fundamentally psychological phenomenon that directs behaviour. Opportunity is the encompassment of all the factors which may lie outside of individual control which may prompt behaviour or action. Opportunity can influence motivation as can capability; enacting a behaviour can alter capability, motivation, and opportunity (Michie & Ashford *et al.* 2011; Davis *et al.* 2015).

COM- B as a model for behaviour can be applied to patients to identify the components of a behaviour and how they can be changed using an appropriate intervention, but it can also be applied to clinician's behaviour and used to determine the influences and factors which prompt

clinician's to engage patients in a behaviour change conversation (Jackson *et al.* 2014).

2.11 Motivational interviewing

Motivational interviewing (MI) is a type of counselling advice developed to interact with hard to change addicts. It is a directive method which aims to remove the ambivalence which patients may feel about making behavioural changes. MI is patient centred and aims to enhance the patient's intrinsic motivations to change. The method was first described by Miller in 1983 as an approach to treat alcoholics (Rubak *et al.* 2005; Miller & Rollnick 2004).

MI is now a widely used counselling method to help clients with CVDs to modify their unhealthy lifestyle and thus decrease their risk of disease occurrence. Practicing MI requires the ability to ask open-ended questions, the ability to provide affirmations, the capacity for reflective listening, and the ability to periodically provide summary statements to the client. Therefore, it is important a clinician has the necessary skillset to perform MI (Brobeck *et al.* 2014).

Nevertheless, MI has been demonstrated to be easy to learn and implement in short consultations of less than 15 minutes duration (Brodie & Inoue 2005). Motivational interviewing may be used in brief interventions to encourage patients to change unhealthy behaviour which can benefit their cardiovascular health (Emmen *et al.* 2004).

The delivery of behavioural change advice from the practicing clinician is imperative for the patient to initiate change of their health harming behaviour. Importantly, if clinicians do not give advice on lifestyle changes the patient may consider their behaviour to be irrelevant for their predisposition for developing disease or even not responsible for their current disease state. MI is a good method of delivery of advice to the patient as the aim is to avoid putting the patient on the defensive (Brodie & Inoue 2005).

Interestingly, a systematic literature review by Lee *et al.* (2016) of the MI technique which considered 9 randomised control trials (in which the trials evaluated lifestyle modifications included smoking habit, physical activity, and alteration in dietary habits, such as increase in fruit and vegetable intake and decrease in fat intake) found that among all of these lifestyle outcomes, MI exhibited significant positive effect on smoking habit only (Lee *et al.* 2016). Moreover, the deliverers of the intervention and the associated training they received also varied among the studies. Deliverers included nurses, physicians, physical activity specialists, life coach, dietitians, and so on. This heterogeneity in the background of the intervention deliverers complicated the determination whether professionals may have exerted a different degree of effort on a particular outcome based on their own expertise. In addition, six studies mentioned that MI training was provided to the staff who delivered the intervention, whereas

the three remaining studies did not mention it.

Currently, motivational interviewing is utilised in a primary care setting and on an impromptu basis (Hardcastle *et al.* 2013). Motivational interviewing may be successfully utilised alongside a prescription such as the L to better enhance the guidance being given by the clinician to the patient. It may be possible to form the behaviour change conversation around the L as well as prompting the clinician to ask appropriate questions.

2.12 Transtheoretical model

The stages of change model developed by Prochaska & Velicer (1997) provides a solid framework enabling a primary healthcare practitioner to implement behavioural interventions utilising the motivational interviewing technique.

According to the TTM, the stages of change are; precontemplation, contemplation, preparation, action, and maintenance of the behavioural change.

Precontemplation means the individual is either unaware or is completely not willing to make any change. Contemplation means the individual is aware there is a problem and is considering making a change. Preparation is the stage in which an individual is ready to make a change in the near future. Action is the stage in which the individual is implementing a behavioural change and maintenance is when the individual is trying to sustain the change that has been made. It is not uncommon for individuals to move backwards and forwards along the path of the stages of change until eventually coming to the maintenance stage and staying there permanently. Therefore, the TTM model allows the process of change to be a cyclical event with the individual progressing but also regressing, often multiple times, throughout the change process.

Of note, 68% of patients seen in primary care are in the precontemplative stage and contemplative stage of change (Norcross *et al.* 2011). This statistic is imperative to be aware of when implementing interventional strategies in primary care and when making policy which consider making every consultation count. Due to the nature of the precontemplative stage it is important that the clinician is aware that the patient may become defensive if directly challenged about their behaviour and thus a motivational interviewing method would be more effective at engaging them.

Nevertheless, this statistic also indicates the important position that healthcare providers, especially primary care practitioners, are in to initiate patient behaviour change of health harming behaviour. This is a large part of the basis for the use of the L, especially in a primary

care setting.

It is therefore crucial that practitioners are taking every available opportunity to initiate a behaviour change conversation with the vast majority of patients which they come into contact with to promote a healthy lifestyle and take advantage of the 'teachable moment' and the power that the clinician has in giving advice to patients that counts (McBride, Emmons, & Lipkus, 2003). This scenario is a part of 'making every consultation count' which is now part of UK government health policy (Lawrence et al., 2016).

This evidence is crucial to consider for the use of a lifestyle prescription form. The script is able to act as a prompt for the practising clinician to give advice as well as provide guidance for the patient when they leave the consultation room. This, what is in essence a brief intervention, could act as the catalyst for progressing the patient into the next 'stage of change' which would be preparation.

2.13 Health belief model

According to the health belief model (HBM), individuals who have accurate knowledge of CVD and perceived susceptibility to and consequences of the disease, and are aware of the benefits of taking preventive measures are more likely to make important lifestyle choices to prevent the onset of disease (Green & Murphy, 2014). Most theories applied to public health interventions tend to emphasise individual capabilities and motivation, with limited reference to context and social factors. Intervention effectiveness may be increased by drawing on a wider range of theories incorporating social, cultural and economic factors that influence behaviour.

The health belief model is drawn upon in the development and use of the L as it is a tool which informs patients of risks to their health from health harming behaviours.

2.14 Multiple health behaviour change

As health harming behaviours regularly co-exist it makes sense to target the detrimental behaviours synergistically. Multiple health behaviour change (MHBC) interventions aim to address a spectrum of health harming behaviours. MHBC are often necessary due to the frequent co-existence of disadvantageous behaviour such as smoking and drinking or smoking and lack of physical activity. In the same way that unhealthy behaviours tend to co-exist healthy behaviours do so too. People who choose to eat healthily are more likely to partake in more physical activity (Goldstein, Whitlock, & DePue, 2004).

However, a recent systematic review and meta-analysis by Alageel *et al.* (2017) of 31 trials with a total of 36,484 participants found that targeting multiple health behaviour change interventions to patients in primary care with the risk factors for cardiovascular disease did not have any statistically positive effects on any physiological metrics which are CVD risk factors (Alageel, Gulliford, McDermott, & Wright, 2017).

Nevertheless, it was concluded by Alageel *et al.* (2017) that published experimental reports are not adequately providing information on the behavioural change theory which is being used when delivering health harming behaviour interventions targeting cardiovascular disease. The systematic review concluded that it is necessary that BCTs are properly recorded and coded in studies which utilise them to enable further development of interventions and behaviour techniques in primary care and thus to be able to provide proper evidence based behaviour change counselling and intervention (Alageel et al., 2017).

This point is reinforced by evidence from Michie *et al.* (2013) whom concluded the need for a strict behaviour change intervention taxonomy to accurately develop and initiate behaviour change interventions, especially when the interventions target multiple behaviours. It is possible that interventions can become too broad and with a lack of theoretical backing which can lead to the intervention becoming irreproducible and scientifically invalid (Michie et al., 2013).

2.15 Clinician engagement

Clinicians often report feeling ill-prepared or ill-trained to engage patients in conversation about their health harming behaviours and health harming lifestyle choices. Clinicians are well trained to deal with the outcomes of these health harming behaviours such as cardiovascular disease by prescribing pharmacological interventions or referring to specialists for treatment but are often lacking in the skills, competence or capability to initiate behaviour change in their patients which would lead to better health outcomes and crucially save the health service time, money and resources (Jackson *et al.* 2014). One clinician described this as “firefighting” as opposed to preventing the chronic disease outcome from ill lifestyle.

The COM-B model can be applied to the clinician’s ability to perform behaviour change as well as the patient’s ability to undertake behaviour change. In fact, research has demonstrated that medical practitioners may need to undergo their own behaviour change to actually perform

behavioural change interventions with patients. This is due to practitioners becoming comfortable with a standard way of operating and not diverging into unknown territory in terms of treating their patients (Cook, Montori, McMullin, Finfer, & Rocker, 2004).

Using the COM-B model it can be seen that clinicians have the capability to perform behaviour change interventions with their patients if they are trained and if they have the tools to perform such an intervention. Clinicians have the opportunity to engage patients in behavioural change every time they have a consultation with a patient - a 'teachable moment'. Motivation to perform behavioural change with patients then depends on the contextual circumstances for each different practitioner and also whether they practice in a primary or secondary care environment. Typically, it could be expected that motivation to engage patients in behaviour change should be high as the more patients engage in behavioural change and thus reduce their health harming behaviours, the less burden would be placed on the health service - both primary and secondary.

Using an L□ may provide clinicians with the confidence to attempt a behaviour change conversation even if the clinician has not received any formal training (Kaner & McGovern 2013). An L□ also highlights to the clinician the opportunity which has been presented to them by way of instigating a behaviour change conversation as the L□ is a material, desk-based resource which acts a prompt.

In a study of GP perceptions of using a New Zealand green prescription form (GRx), it was found that the main barrier the clinician faced, in giving advice on and referring with a green prescription, was time. GPs were confident and competent at using green prescriptions to refer patients to support services that enabled them to engage more in physical activity and receive nutrition counselling (Patel *et al.* 2011).

Patients may respond differently to clinicians giving behaviour change advice. Nurses have more training in delivering interventions to patients and giving lifestyle advice but physicians may have more authority to give advice in the eyes of the patient (Noordman *et al.* 2012). Therefore, taking this into account it was expected that the L□ would be utilised differently by different types of clinicians as well as prescribed to different groups of patients depending on the kind of clinician prescribing it.

2.16 Who gives lifestyle advice?

From the literature search it appeared that lifestyle advice is given by many different clinicians and in varied settings including in primary and secondary care.

Doctors may be seen as having more authority for giving lifestyle advice to patients due to their status as being at the top of the medical hierarchy. In this sense, lifestyle advice may be more effectively administered when given by doctors (Keyworth *et al.* 2016).

Nurses and other allied health professionals seem to spend more time talking to patients about lifestyle changes than doctors do in consultations. It is apparent that the predominant reason for this is doctor cited lack of time Lundberg *et al.* (2016).

Nurses may be better suited to giving lifestyle advice due to their more regular engagement of such socioeconomic health related issues whereas doctors may be more comfortable dealing with health issues which require pharmacological treatment (Brobeck *et al.* 2014). Doctors are naturally trained in prescribing pharmaceuticals for ailments than they are behavioural changes or other kinds of social prescriptions. Due to this, nurses may be more appropriately trained in delivering behaviour change advice in varied clinical settings because of their potential malleability in delivering a prescription which they have not routinely done before.

A study by Lawlor (2000) determined that general practitioners do not see it as their role to engage in a population wide lifestyle change approach. GP's felt that their role was more of secondary prevention rather than being the tip of the spear in terms of preventing health harming behaviours in the population. From the study, it was determined that general practitioners were of the opinion that the preferred way to improve population wide health harming behaviours was to instigate it with a centrally co-ordinated approach and via multiple agencies (Lawlor *et al.* 2000).

2.17 Evidence of prescriptive advice

It is not clear from the literature whether written advice issued by a medical practitioner is more effective at changing patient behaviour than verbal advice alone. Brief interventions conducted by a doctor or nurse are normally performed with verbal instruction/ advice giving and using a method similar to or the same as the motivational interviewing form which has good evidence and training associated with it.

Nevertheless, in a green prescription study it was found that written and goal-oriented advice in the form of a prescription was effective at increasing exercise participation amongst a wide patient group (Swinburn *et al.* 1998). This finding is in line with research by Michie *et al.* (2008) who determined the most successful methods of changing lifestyle behaviour, self-efficacy being a key determinant and the use of written instruction and goals as a means of achieving this.

The green prescription has a vast amount of literature dedicated to its use and feasibility, predominantly in the primary care setting in New Zealand. The research of the green prescription is useful in the development of a lifestyle prescription for Wales, UK due to the very similar demographics and geographical circumstances of the two populations.

The New Zealand Green Prescription is a public health intervention developed in the 1990's to improve New Zealander's activity levels and has been successfully used especially in improving exercise adherence amongst lower socioeconomic classes. The key element to the Green Prescription is its administration as a bona fide *prescription* (Swinburn *et al.* 1998).

A systematic review by Orrow *et al.* (2012) of 15 trials with 8745 participants determine that promotion of physical activity to sedentary adults is useful in improving physical activity levels over a period of 12 months but they could not find sufficient evidence that physical activity promotion schemes are more effective at changing behaviour than other advice or counselling schemes. It was determined that longer periods of follow up were necessary to evaluate the effectiveness of changing physical activity behaviour in the long term which would thus indicate that behaviour change had successfully taken place (Orrow *et al.* 2012).

This is relevant as the L is a script designed to be used by any prescribing clinician regardless of their training in behaviour change or counselling. Furthermore, the L does not *refer* the patient but instead *signposts* the patient to services which would be able to provide help, support and counselling including services such as 'Help me Quit' in Wales, a service run by Public Health Wales (helpmequit.wales 2018).

Therefore, although written instructions in the form of a prescription are known to be valued and respected by patients it is not clear whether or not written advice would be more effective than verbal advice in changing patients' health harming behaviour (Johnson & May 2015). However, written communication is beneficial in the continuity and in the standardisation that it enables when providing patients with health information and guidance. It may be beneficial for the prescribing clinician to give personalised verbal guidance alongside written formalised and standardised instruction.

Nevertheless, the aim of the L is not to replace a verbal advice or a behaviour change conversation but to in fact instigate the conversation in the first place. The L has a main aim of being a prompt and an instigator of clinician interaction with the patient to discuss lifestyle behaviour and to provide a template for conversation.

Prescription forms are used by healthcare practitioners and it is known that practitioners are comfortable using these forms. This comfortability with a familiar tool may encourage clinicians to use the L in any given consultation- when appropriate. Crucially, it *will* be appropriate most

of the time, due to the large percentage of the population who present to general practice or a hospital with health harming behaviours. Furthermore, general practice in New Zealand and the United Kingdom is an ideal setting to identify sedentary adults and deliver brief interventions advising on physical activity as more than 80% of adults visit at least once a year (Elley *et al.* 2003). After decades of limited success in incorporating health behaviour issues into medical practice, a key challenge was how to engage those primary care clinicians who are in small- to medium-sized primary care practices, the dominant model of primary care delivery in the healthcare system.

The “green prescription” (GRx) intervention may be a suitable model to base the future development of the L on. In the GRx method primary care clinicians are engaged in four hours of training of the motivational interviewing methodology to give them the competency to effectively administer the GRx to patients. Patients are identified early on through a screening system conducted by receptionists in primary care and issued with a prompt card which states the patients ‘stage of change’ (physical activity) which the patient then hands to the consulting clinician. The clinician then discusses this lifestyle behaviours with the patient and determines suitable goals for the patient to work towards. The goals are written on a standard green prescription which is prescribed to the patient and a copy is faxed to the local sports foundation who make contact with the patient to provide support and encouragement, also utilising the motivational interviewing method (Elley *et al.* 2003).

Elley *et al.* (2003) found that the GRx was an effective intervention conducted via general practice for increasing participant’s physical activity levels and improving their quality of life over 12 months without any evidence of adverse effects. Furthermore, it was also found that there was a trend in participant’s blood pressure decreasing. However, no significant decrease in coronary heart disease risk was demonstrated. Of note, it was found that for every 10 green prescriptions written, one person achieved and sustained 150 minutes of moderate or vigorous leisure activity per week, at 12 months. Achieving this amount of activity (using up an additional 1000 kcal/week) is associated with a 20-30% risk reduction in all-cause mortality compared with sedentary individuals (Elley *et al.* 2003).

More research into the GRx by Hamlin *et al.* (2016) on the long term effectiveness of the GRx indicated that the GRx is even effective over periods of 2-3 years for both males and females. They concluded that to improve the rates of compliance with the GRx, better communication was necessary between service providers. However, such a long period of effectiveness for a behaviour change intervention is of note due to the preponderance of behaviour change interventions to diminish in their effectiveness over time (Hamlin *et al.* 2016; Kwasnicka *et al.* 2016).

Swinburn *et al.* (1998) attests to the use of prescription forms for guiding behaviour change issues. General practitioners have access to a large proportion of the population who engage in health harming behaviours. Therefore, the prescription is an appealing paradigm to issue behaviour change as they represent a well understood interaction between clinician and patient. The prescription enables tangible goals to be set with information and advice as well as reducing the burden placed on primary care and easing the amount of time taken to provide lifestyle advice (Swinburn *et al.* 1998).

Additionally, the GRx was more effective over a 6 week period than verbal advice alone in increasing physical activity (Hamlin *et al.* 2016).

2.18 Prescription form background

Medical prescription forms (symbolised by ℞) which may be abbreviated as Rx are instructions issued to a patient to acquire pharmaceuticals, prescription drugs, or to undergo a health care programme. The instructions govern the plan to be put in place by the prescribing clinician. Prescription forms may only be issued by a suitably qualified clinician. For prescriptions to be legal and useable, they must be authorised and signed by a qualified medical professional.

The use of prescription forms in medicine has a long history in the field of medicine. The symbol ℞ represents what medical prescriptions historically derive from, recipes. Original medical prescription were recipes, instruction, issued as orders from a shaman or other person in a community deemed to have the authority or power to heal. It is from these that we have the present-day doctor. An interesting area, but medical history is out of the scope of this review.

In the modern day, prescription forms are well understood by patients to be instructions from a medical professional to acquire treatment. Prescription forms have a respected status amongst patients. They are also seen as confirmation by the doctor that the patient is indeed in need of medical attention. Therefore, patients often hope to receive a prescription when they see a doctor, this is certainly applicable in primary care where up to 67% of patients expected to receive a prescription form according to one study (Britten & Ukoumunne 1997).

It is because of the status of prescription forms and the acknowledgment that patients in primary care often expect and hope to receive one, that the L℞ is fundamentally based, in design and concept, on a regular prescription form. In Wales, UK where this research was conducted, a standard prescription form is referred to as a WP10 by the medical community.

In Wales, a prescription form is a WP10 as this is a bilingual version of the FP10 prescription form which is used in England. The WP10 was taken and used as a backbone for the design

of the L□.

2.19 Lifestyle prescription

The L□ then is a culmination of previous research delineated in this review. The reasoning behind the L□ stems from theory including, self-determination theory (Ryan & Deci 2000) and also the COM-B mode (Jackson *et al.* 2014).

Although the patient is the target of the behaviour change to improve health outcomes in the population. The clinician is as much a target in the model due to their necessary participation in engaging the patient. To this end, clinician behaviour must also change with the development of new behaviour change theory and best practice. It is hoped that the L□ will act as a sign post for the clinician and to remind them to have a behaviour change conversation with patients. It is also hoped that the use of the form will increase confidence and enhance the clinician's own capability in line with the COM-B model.

The L□ also acts as a way of *standardising* health harming behaviour advice given to patients. It enables clinicians to have a talking point on the main areas necessary to change. The L□ is kept up-to-date with the most relevant services to help patients change their behaviour, including the Welsh 'Help Me Quit' service. Furthermore, as previously found in the GRx, the L□ is a tangible aid for giving patients guidance and goals (Hamlin *et al.* 2016).

2.20 What this review adds

There is little literature which fundamentally discusses the delivery of multiple behavioural changes such as smoking cessation, PA increase, alcohol reduction and eating a healthy diet in a *prescriptive* manner. In this regard there is a gap in the literature as there is a fundamental difference between advice giving and prescribing. Patients regard a prescription form in a different manner and with a different level of authority than they do very brief advice received from a clinician in a 10-minute consultation (Britten & Ukoumunne 1997).

Furthermore, there is little literature which investigates the use of a material piece of lifestyle guidance to be delivered to patients and the effect of such a material on the clinician's likelihood of instigating a behaviour change conversation. Behavioural change for both the patient and clinician is two sides of the same coin. Before patients can successful commit to changing their health harming behaviours it is first necessary that the clinician has the ability to have the behaviour change conversation and perform a brief intervention. This conversation may be more likely to take place if the clinician is prompted by a visual material aid such as a

lifestyle prescription. What's more, a lifestyle prescription would contain the necessary advice which may cue to the practitioner to attend to the most necessary behaviours for the patient to change. This process can be explained by the COM- B model (Jackson *et al.* 2014) which explains the need for the clinician to have the capability to perform the conversation/brief intervention, the opportunity (such as the patient being in the 10 minute consultation) and the motivation to perform the brief intervention (such as improved patient outcomes, reducing the burden on the practice etc).

Most present literature attests to the virtues of using motivational interviewing as well as the usefulness of the trans theoretical model (Prochaska & Velicer 1997) to underlie the process of how change is instigated (Brobeck *et al.* 2014). This literature review adds to the field of the knowledge the need for further research into the effects of prescriptive behavioural changes to a patient with cardiovascular disease or its risk factors. The concept of bona fide prescription of behavioural changes via a made-for-purpose prescription form is novel. A prescription form that is designed to be solely used for behavioural change intervention, which would fit within the context of a consultation revolving around behaviour change, may aid patients in their change of behaviour- focussing on 'the big four', smoking, physical activity, alcohol consumption and healthy eating.

It is crucial that primary care practitioners are trained in behaviour change counselling. Over 80% of the UK population consult with GPs annually, which provides the potential for opportunistic behaviour change advice and thus makes 'every consultation count' (Lawrence *et al.* 2016). Not only this but there are on average more than 5 GP consultations per person per year. This figure indicates many people see their GP more than once per year and therefore enables follow up. A study by Buttar *et al.* (2005) found that although the study primary outcome was not met (a composite measure of beneficial behaviour change at 3 months post intervention) patients who had seen a clinician trained in behaviour change counselling were significantly more likely to feel they had been engaged about behaviour change (91.1% vs 55.0%) and also were intending to change a lifestyle behaviour (72.1% vs 49.3%) (Buttar *et al.* 2005). This study provides justification for trialling a new technique in primary care such as the use of multiple health behaviour change leaflet in the format of a prescription form combined with signposted advice and services.

2.21 Where this review leads

This literature leads to the research study outlined in this dissertation which aimed to assess clinicians' perceptions of a lifestyle prescription for use in the primary and secondary care setting to determine if clinicians would find it a useful tool for engaging patients in behaviour change. The study was justified by the finding that there is a gap in the scientific literature as

to the usefulness of prescriptive behaviour change advice.

3.0 Methods

3.1 Initial evidence

The research contained within this dissertation stems from two parallel studies conducted in primary and secondary care in the Cwm Taff University Health Board,

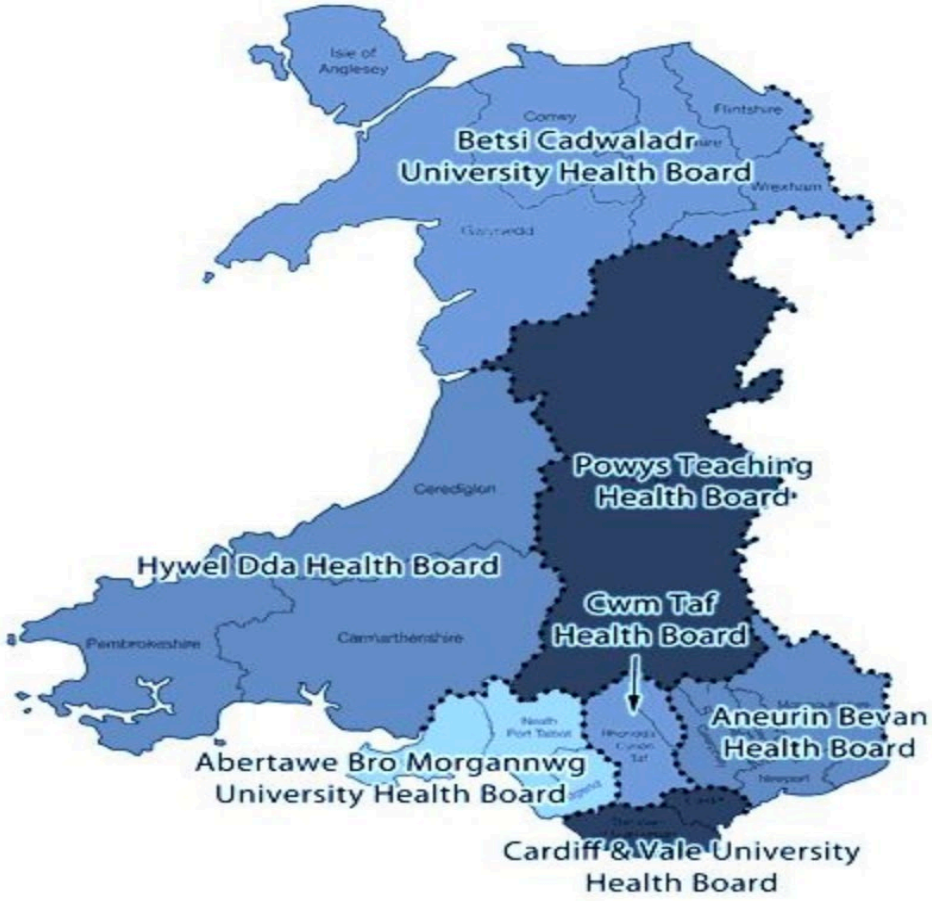

Figure 3. Map of Wales showing the location of the Cwm Taf University Health Board and surrounding health boards of Wales.

CTUHB, Wales, UK (Figure 3). Both studies, labelled P-PLAC and S-PLAC, involved first the creation of written protocols (appendix) and ethical approval through the NHS and also the University of South Wales Faculty of Life Sciences and Education ethics committee. As Chief Investigator, I attained a good clinical practice qualification by completing the necessary modules. The course informed me of how to conduct healthcare research in abiding by correct ethical and documentary procedures. The studies also necessitated the completion of IRAS forms online (appendix) due to the nature of conducting research in the NHS. Both S-PLAC and P-PLAC were enrolled onto the NHS research portfolio system.

Anecdotal evidence from several clinicians determined the initial suitability for the prescription form to be used in a healthcare setting before the commencement of the studies and thus provided scope to perform a larger survey on healthcare professional's opinions of the L concept to find if they would utilise it in their own clinical practice. It was determined that the MRes should be made up of two parallel but separate studies to suitably elucidate the effectiveness of the L in the two predominant healthcare settings, primary care and secondary care.

Forms for the studies were created included protocols, participant information sheets, consent forms; these are available in the appendix.

3.2 Overall recruitment

For P-PLAC and S-PLAC; practitioners located in the CTUHB board were speculatively contacted with a letter of invitation via email asking for an expression of interest to take part in the study. Clinicians that indicated their wish to take part in the research were sent a participant information form detailing what is expected from them during the research and how the L will be used during their consultation. The lead investigator arranged a visit to gain consent and give more information to the prospective participants. Participants signed a written consent form to take part in the study which informed them of their right to withdraw from the study at any time. Clinicians in the secondary care setting at Royal Glamorgan Hospital were recruited as well as practitioners in general practice in the Cwm Taf Health Board. The Royal Glamorgan Hospital is located in the Welsh Valleys and serves a large area of mixed economic structure including areas of high deprivation. The geography of the location was taken into account when conducting the study as the practices were spread far apart from one another. Participants were given 1 month to partake in the study and issue as many scripts, from a pad of 20, as they could within this time frame to patients which they deemed suitable to receive a L.

Thirty-six healthcare professionals were recruited into the study which included primary and secondary care clinicians of varying specialties; 18 doctors (12 secondary care of varying specialties and 6 general practitioners), 15 nurses, and 3 healthcare assistants in general practice. The full breakdown of recruited practitioners was consultant cardiologist (3), Consultant pulmonologist/ respiratory physician (3) cardiac rehab nurses (4) consultant diabetologists (2) registrar diabetologist (1) general physician (2) preoperative nurse (1) heart failure nurse (2) consultant geriatrician (1) general practitioner (6), nurse practitioner (8),

healthcare assistant (3).

3.3 The desktop pad development

The L pads were printed professionally in colour with 20 sheets to a pad. The pad was designed to be used on a GP's desktop or on an outpatient clinic desk. The pad was developed with GP's in mind, but the study recruited varied specialties to appropriately assess its functionality.

3.31 L development

Figure 4. The L form.

The L (Figure 4) was developed by Public Health Wales with other stakeholders including the Cwm Taf University Health Board. The material is novel in its multiple health harming behaviour change advice as well as up-to-date signposting to local services. Crucially, the script was designed to emulate a bonafide prescription form (WP-10) which is signed by prescriber as well as the patient receiving it. The design and creation of the L was commissioned by Public Health Wales with input from multiple organisations and practitioners including GPs, Cwm Taf Public Health Team, Wales Centre for Behaviour Change (Bangor University), dieticians, Psychologists, Nurses, Communities First Work Club, Caerphilly Cohort findings and current guidance.

During the course of the study the L script was developed further to make it more suitable for use by the varied specialties of participants which used the script. Each L was allocated a different version number. “As your doctor” was changed to “As your prescriber” to enable the L to be used by clinicians other than doctors. Also, on traditional prescription forms the words, “Prescribers signature” are featured.

A standard prescription form does not have to be signed by the patient. It is only signed by the prescriber. The L□ is signed by the patient too as this forms a key part of the 'behavioural contract' which the L□ is trying to instigate.

Before the study commenced the L□ was also updated to display up-to-date contact information for the services which are listed on the back. This was primarily because *Stop Smoking Wales* was merged into a service called *Help Me Quit.* Wording of the advice which is given on the L□ was updated to appeal to a broader audience and not be deemed too paternalistic.

The back of the L□ pad contained a section which displayed advice for the participant to use (Figure 5). This information was created to guide the clinician in their use of the L□ and also to act as a prompt for them to undertake a behaviour change intervention.

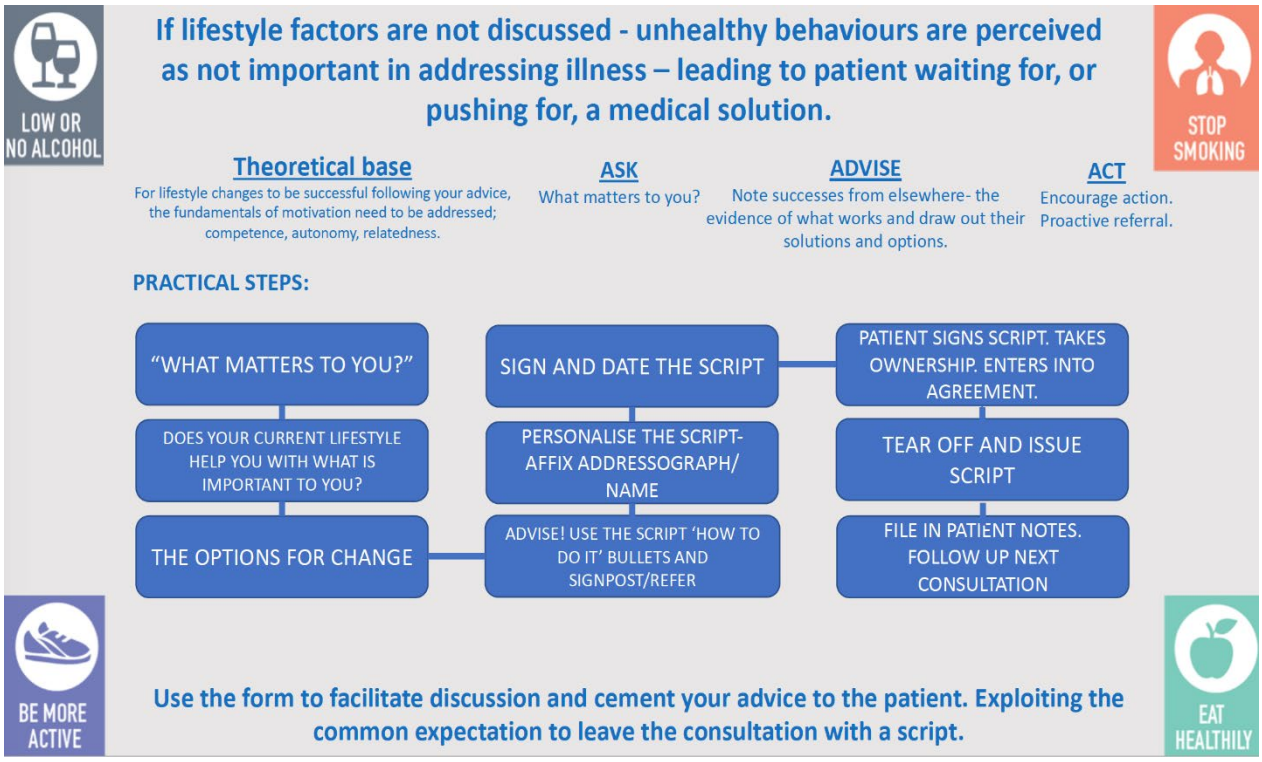

Figure 5. Back of the LR pad containing advice for clinician.

3.32 Log form

A log form (Figure 6) was created and integrated into the L□ pad. This was to be used by the participants of the studies to collect data on the reason for issue of an L□ script as well as

anonymous demographic data on the patient it was issued to. With consultation with the healthcare professionals and public health wales we developed a log form to capture the key data applicable to the study to enable accurate assessment of how the L was utilised.

Prescriber Name					Role			Specialty					STUDY PIN#			
SCRIPT #	AGE	SEX		SEEN IN WARD (W) OR CLINIC (C)		Advice given				Cardiovascular disease - YES/NO/UNCONFIRMED			Why was the script issued? R – responding to request for advice A – alternative to prescribing meds P – used as adjunct to prescribing meds L – alongside a referall			
		M	F	W	C	Smoking	Alcohol	Diet	Activity	Yes	No	Unconfirmed	R	A	P	L
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Figure 6. The L participant log form.

The log form contained cells for the participant to collect patient data such as; Age; Sex; If the patient was seen in the ward (W) or outpatient setting (O); the advice given to the patient (smoking, alcohol use, diet, exercise); why the L was issued (either responding to a request for advice from the patient); as an alternative to prescribing medication; used as an adjunct to prescribing medication; alongside a referral; if the patient had established cardiovascular disease.

3.4 P-PLAC

For the P-PLAC arm of the study general practices were speculatively contacted by email or by site visit to ask for their participation in the study. 26 practices in total were contacted of which 6 practices engaged and requested to join the study with a total of 18 participants.

The initial research into conducting the P-PLAC arm of this research consisted of attending primary care practices within the Cwm Taf health board to gauge their interest in taking part in the research. Visiting practices enabled us to speak with general practitioners and nurse practitioners, as well as the practice managers, to assess the feasibility of conducting the

research at these premises.

Most interactions were positive about taking part and the initial response to the concept of the L was often met with curiosity and intrigue as well as a willingness to use it. The visits, although informal, enabled us to gather verbal feedback and determine the most suitable way of conducting the research in the primary care setting in the Welsh Valleys.

Due to the nature of the study and the logistics involved in recruitment, the Research and Development department at the Royal Glamorgan Hospital were actively involved in helping to recruit for the project and engage clinicians.

3.5 S-PLAC

The S-PLAC arm of the research study commenced around 2 months later than the P-PLAC arm. This was to enable the development of a separate and specific protocol and to gain ethical approval from both the NHS and also the USW faculty ethics committee.

I gave a presentation at the Royal Glamorgan Hospital (RGH) to make clinicians aware of the study and give an overview of the L form and why it was being developed and trialled. The presentation received favourable feedback and enhanced the participant recruitment of the study.

Regular visits were made to the RGH to recruit clinicians. Naturally, it was a difficult task to recruit very busy clinicians and therefore much time was spent trying to do this.

As part of my education in the workings of the secondary care system I spent time in clinic with a Consultant Cardiologist. This informed me further of how a tool such as the L could fit in to an outpatient setting in secondary care and how it may be used. I also sat in consultations where the same cardiologist prescribed the L and from this I was able to receive direct verbal feedback on the ease of use of the L and how it could be improved.

3.6 Survey development

A questionnaire was developed to canvass the opinions of the participants in primary and secondary care which took part in the study. The questionnaire was developed alongside

Professor Mark Williams, and also the Public Health Wales Consultant in Public Health Ashley Gould. The questionnaire was designed to assess clinicians opinion of the LRx, who regularly consult with patients with multiple health harming behaviours, including their likelihood of utilising it and their thoughts on its appropriateness. The questionnaire was administered via the online service, Bristol Online Surveys (onlinesurveys.ac.uk).

The questionnaire gave the participant a list of statements and asked them to select an answer of 1-5 based on the Likert scale. 1 indicated strongly disagree, 2 disagree, 3 neutral, 4 agree, 5 strongly agree.

A questionnaire was used as this was the most efficient way of obtaining feedback from clinicians with little time to spare during their working hours. The questionnaire enabled the acquisition of feedback on the LRx which was adequately detailed to inform its further development.

A Likert scale was used to obtain clinician feedback as this was deemed the most appropriate method of capturing data of these items in questionnaire format considering the novel items which were being used. The questionnaire also contained a free text element to enable clinicians to enter their own feedback. A 5-point Likert scale was used which gave the participant the option of a 'neutral' value. A neutral value was perceived as being positive in the dichotomous analysis of the results. This was due to the assumption that participants who felt neutral about the LRx would probably not be averse to it's use or place in the medical setting. It is also known that participants tend to choose the extremes when a Likert scale is used to collect survey information.

The questions used in the survey were developed with input from the academic study team and were developed to gain useful feedback on clinician's perception of the LRx. A similar questionnaire had not been previously developed due to the uniqueness of the resource which as being examined. This necessitated the development of a questionnaire with items never previously used in qualitative research, to the author's and study team's knowledge.

The questionnaires can be found in separate files linked to the appendix.

3.7 Ethics and Governance

P-PLAC and S-PLAC were approved by the Faculty Research Ethics Committee, University of South Wales. The studies received a favourable review by the Cwm Taf University Health Board Research Risk Review Committee. Written informed consent was obtained from each participant.

3.8 Statistics

All statistical analysis was made using SPSS (IBM SPSS Statistics for Apple Mac, Version 14, Armonk USA) with statistical significance defined $p < 0.05$. Comparisons between groups, including primary care and secondary care and doctors and nurses, were made using the non-parametric Mann Whitney test. A chi squared test was used to assess significance between the percentage differences in responses to the survey questions.

4.0 Results

Overall, twenty-three participants completed both the end of study questionnaire and the log form (64% completion) (figure 7).

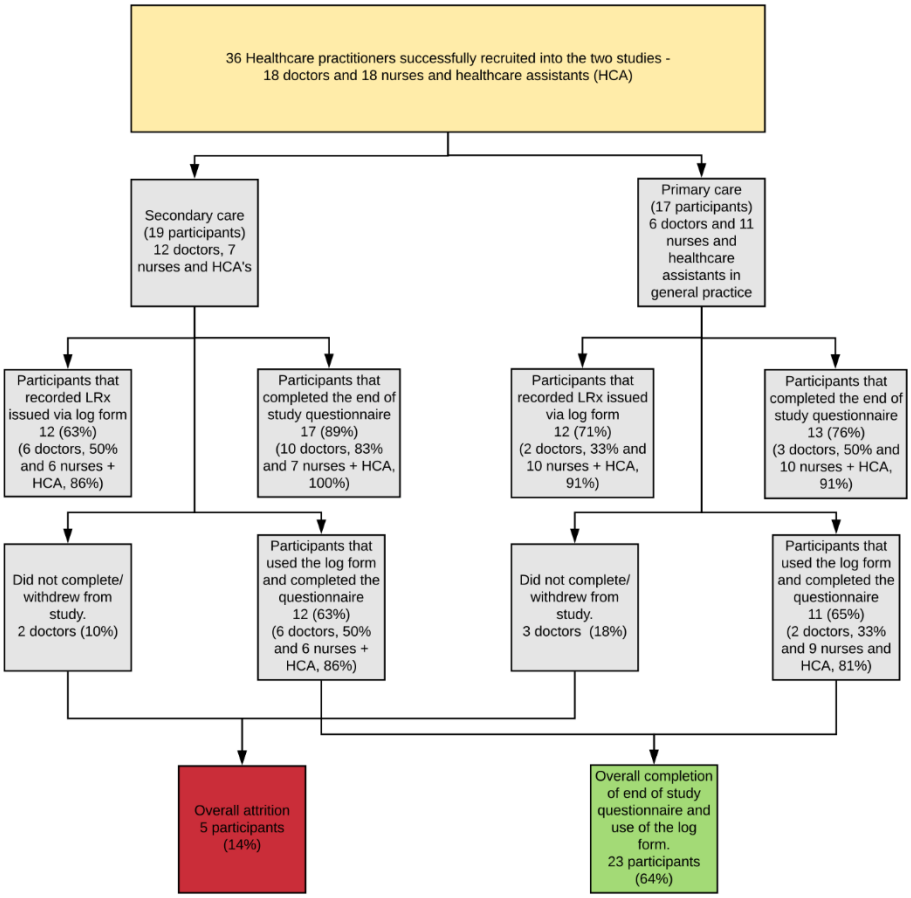

Figure 7. Flow chart illustrating participant outcome

The number of L prescribed by each participant varied widely from 0 to the maximum of 20. This data was obtained from the log form which was completed by the participant. The mean age to which an L was prescribed was 56 years (range 35 - 75 years). The mean percentage of L prescribed by a participant was 41% (CI 29-55%).

The results are stratified into the two arms of the study; primary care and secondary care. Participants recorded on the log form the advice they gave to the patient with the use of the L as well as the reason for prescribing the form from a choice of; responding to request for advice, as an adjunct to prescribing medication, as an alternative to prescribing medication or alongside a referral. There was no restriction on the number of reasons to which the form was prescribed or for which advice was given.

4.1 Prescription distribution in Primary Care

In PC, 11 participants distributed 108 LRx forms from a possible 240 (45%) to patients (mean age 53 years, range 35-66 years, Male:Female 57:43 %). 22% of the LRx were prescribed to patients with established heart disease. The mean percentage for prescribing each lifestyle change were as follows; dietary (62%), physical activity advice (61%), smoking advice (48%), alcohol advice (25%), The mean percentage for each reason for issuing an LRx was as follows; 51% as an adjunct to prescribing medication, 46% LRx issued in response to a request for advice from the patient, 14% as an alternative to prescribing medication, 3% alongside a referral to SC.In the Primary Care arm 12 participants distributed 108 L forms from a possible 240 (45% prescribed). The mean age of the patients for which the L was prescribed was 53 years (range 35-66 years).

4.2 Prescription distribution in Secondary Care

In SC, 12 participants distributed 88 LRx forms from a possible 240 (37%) to patients (mean age 60 years, range 48-75 years, Male:Female 68:32 %). 55% of the LRx were prescribed to patients with established heart disease. More LRx were prescribed in clinic/outpatient settings than in the ward setting; mean 80% clinic, mean 20% ward. The mean percentage for prescribing each lifestyle change were as follows; diet (69%), exercise (64%), alcohol advice (38%), smoking advice (36%). The mean percentage for each reason for issuing an LRx was as follows; 34% LRx issued in response to a request for advice from the patient, 34% as an adjunct to prescribing medication, 27% alongside a referral, 20% as an alternative to prescribing medication.

4.3 Comparisons

Completed questionnaires and log forms were received from 11 primary care and 12 secondary care participants, respectively (Table 1).

Question or statement Responses	Primary care Response 1, n, % Response 2, n, %	Secondary care Response 1, n, % Response 2, n, %
1) Prior to taking part in the study how often did you give lifestyle advice? *Response 1*: always/ often/ sometimes, *Response 2*: rarely/never	11, 100%, 0, 0%	11, 92% 1, 8%
2) I found the LRx a useful addition to verbal advice *Response 1*: strongly agree/ agree/ neutral *Response 2*: strongly disagree/ disagree	11, 100% 0, 0%	12, 100% 0, 0%
3) Prior to taking part I was confident giving lifestyle advice *Response 1*: strongly agree/ agree/ neutral, *Response 2*: strongly disagree/ disagree	11, 100% 0, 0%	12, 100% 0, 0%
4) The LRx is well designed *Response 1*: strongly agree/ agree/ neutral, *Response 2*: strongly disagree/ disagree	11, 100% 0, 0%	12, 100% 0, 0%
5) found the Lrx fit in well with other patient documents *Response 1*: strongly agree/ agree/ neutral *Response 2*: strongly disagree/ disagree	11, 100% 0, 0%	11, 92% 1, 8%
6) I would me more likely to use an electronic version *Response 1*: strongly agree/ agree/ neutral *Response 2*: strongly disagree/ disagree	8, 72% 3, 28%	5, 42% 7, 58%
7) I used the LRx as a stand-alone source of advice *Response 1*: yes *Response 2*: no	7, 64% 4, 36%	5, 42% 7, 58%
8) I used the LRx alongside a standard prescription form *Response 1*: yes *Response 2*: no	6, 66% 3, 33%	6, 50% 6, 50%
(9) Most of the time I had adequate time to deliver the LRx alongside giving verbal advice *Response 1*: strongly agree/ agree/ neutral *Response 2*: strongly disagree/ disagree	10, 91% 1, 9%	11, 92% 1, 8%
(10) Most of the time the LRx supported the patient interaction well *Response 1*: strongly agree/ agree/ neutral *Response 2*: strongly disagree/ disagree	10,100% 0, 0%	12, 100% 0, 0%
(11) Most of the time I found the content suitable for the patients I saw *Response 1*: strongly agree/ agree/ neutral *Response 2*: strongly disagree/ disagree	11, 100% 0, 0%	11, 92% 1, 8%
(12) The use of the LRx improved my confidence giving lifestyle advice *Response 1*: strongly agree/ agree/ neutral *Response 2*: strongly disagree/ disagree	11, 100% 0, 0%	10, 83% 2, 17%

Table 1. Showing the percentage participant responses to the survey questions.

There was no significant difference, between primary care and secondary care, of the

number of L used or of the mean age prescribed to (P >0.05). There was also no significant difference in the number prescribed to males or females between primary and secondary care (P > 0.05). However, in secondary care more L were prescribed to males than females which was significantly different (p=.017). There was no significant difference within primary care (P >0.05). The reasons for issue for both primary and secondary care groups are shown (Table 2).

Reasons for issuing Rx	Primary care (mean % issued)	Secondary care (mean % issued)	Significance* P
Responding to request for advice	46	34	0.247
Alternative to prescribing medication	14	20	0.5
As an adjunct to prescribing medication	51	34	0.348
Alongside a referral	3	27	0.265
Smoking	48	36	0.369
Exercise	61	64	0.708
Alcohol	25	38	0.293
Diet	62	69	0.595

Table 2. Showing the average percentage for the reason of issue of the L.

No differences were found between the prescribing habits of doctors or nurses across all examined variables except the variable 'prescribed the L in response to request from advice from the patient' p=.006. Nurses and healthcare assistants were significantly more likely to tick this option on the L log form.

Comparisons were made between nurses and healthcare assistants (15) and doctors (8) of the questionnaire responses. There was a significant difference between the response to the question 'most of the time, I had adequate time to deliver the L to patients alongside giving verbal advice' (p = 0.12) as doctors were more likely to disagree or strongly disagree.

4.4 Qualitative Feedback via the questionnaire

Participants were able to leave feedback at the end of the questionnaire. The last part of the questionnaire requested, "Please give any comments or thoughts you have on the lifestyle prescription form. Any at all!" The qualitative data was assessed by the study team and is being used to further develop the L outside of the scope of this MRes.

"I think it's a good idea. I didn't give many out during the study period for a mixture of reasons - many patients needed investigations or medication prescribing, and I felt going through this too would be too much. A larger proportion of patients than I expected had severe pathology

which lifestyle changes wouldn't help with. I would be happy to have them in my clinic room and use them when needed. It was useful to have the contact numbers etc all there on one document, though I don't think the patients took the "prescription" idea well."

"Apologies as I was unable to use any due to the short study window and lack of suitable patients."

"1 patient was not willing to have a lifestyle prescription - probably this attitude reflects his general attitude towards medical advice. It will be great if there is a commitment from both sides doctors and patients for follow up shortly after the prescription is given."

"A useful resource. I would have liked more time to utilise them."

"Well laid out and clear. Wish I had more time to trial this properly."

"I think this is a good way to back up advice given to specific patients. However, on reflection our patient group were not ideal for this study."

"The study ended before I had enough opportunity to further my opinion of their usage. Can see they would have a useful place in cardiac rehab, as it mirrors the advice we discuss with the majority of our patients."

"Suggest make it more patient centred with up to date information on the back."

"Patients seemed to respond to the quit smoking aspect of the lifestyle prescription form. It gave them more confidence to go into a pharmacy and ask for help."

"I thought the script was a good way to enable patients to make decisions about their own health and to consider making changes. It was accepted well as given reasons for change and how they could get support"

"Good to have information all on one sheet."

"Visually very clear leaflets."

"Really good concise advice and contact details all on one sheet. Very useful."

“Carbon copy for notes. Add diabetic advice.”

“I already give advice on everything included as part of the education I provide for patients.”

“I used the form as a 'preoperative prescription' which seemed to help. It would be helpful if the form could be modified to reflect this. If this is not practical, I would happily use the form as it is!”

“Unfortunately, I didn't get around to using it in the time frame which was largely due to having to carry the pad around with me prior to attending clinic. I think the idea of increasing awareness of lifestyle therapies is a good one. I'm not sure it is necessary to make the patient sign, as we wouldn't ask patients to sign for any other type of therapy or prescription and this may make them feel coerced or pressured. The information on the reverse is useful.”

“The form itself is very good. I think my 'problem' is that I'm inclined to talk a lot to patients and giving out information is somewhat secondary. I suspect others used it more usefully than I did.”

“At first I was worried that the patients would feel patronised by the lifestyle prescription. They actually welcomed it and I think that the information and links on the reverse of the script is excellent and an aid to motivation. I would be interested to find out how many times lifestyle advice needs to be reiterated before it is acted on, or if it is more to do with the delivery from the healthcare provider.”

5.0 Discussion

This is the first study, to the author's knowledge, evaluating a novel 'lifestyle change prescription' specifically designed to provide guidance to patients and to prompt clinicians to engage patients in behaviour change and is the first to determine medical practitioners' perceptions of such a material tool for use in the medical setting.

The results of this study indicate that clinicians are in favour of an L for giving advice to patients on changing health harming behaviour. Recruited participants were mostly positive about the L concept but some cited lack of time as the main issue for lack of using the L in consultation. The concept of lack of time for issuing lifestyle or behaviour change advice is a common theme throughout the behaviour change literature when considering the clinicians role in delivering such advice (Elwell *et al.* 2013). Doctors were more likely to cite lack of time than nurses in using the L. This is in line with multiple studies which illustrate lack of time as a main barrier to clinicians engaging their patients in lifestyle change (Lawlor *et al.* 2000; Jansink & Braspenning 2010).

Some participants cited little use of the L during the study due to the "short study window" of 1 month. It was deemed that 1 month should be suitable for most clinicians to administer up to 20 L taking into account the usually high number of patients that a clinician consults with on a daily basis and the likelihood of any given patient requiring lifestyle advice, which is high.

Britten et al (1997) previously found that a large percentage of patients expect to receive a prescription form when in the primary care setting. In fact, 67% of patients hoped to receive a prescription form from their GP. Nevertheless, in this same study 25% of patients hoped for a prescription form but did not receive one. Taking this study into account, the L can be utilised to fill the gap for patients who wish to receive a prescription but are deemed not suitable to receive a pharmacological prescription. A clinician is able to provide an L alongside giving verbal advice to most patients that present to general practice or secondary care. The L may be an aid in taking pressure of clinicians who feel they need to prescribe because the patient wishes to leave a consultation with something tangible (Britten & Ukoumunne 1997).

Management of cardiovascular risk includes adoption of healthy lifestyles. However, uptake and completion rates for lifestyle programmes are low and many barriers to lifestyle behaviour change have been reported in the literature (Jarbøl *et al.* 2017). Therefore, the L proposes a way for practitioners to engage their patients in a conversation around behaviour change, in a brief intervention format. The L is based on the self-efficacy model of self-determination theory Ryan & Deci (2000) which proposes a model which highlights the importance of the

human evolved and necessary inner or ‘intrinsic’ motivation and drive for growth and development. The L suitably capitalises in self-determination theory by giving the patient the resources (tools) to take initiative and act upon for their own wellbeing whilst encouraged to do so by the healthcare professional.

For the patient population to be willing to make behavioural lifestyle changes, it may be first necessary for the healthcare practitioners to have ‘bought in’ to the idea of practicing behaviour change interventions and to see it as their responsibility and duty to initiate behaviour change to reduce health harming behaviours in their patients (Kaner & McGovern 2013) .This study has determined that practitioners are willing to engage with the concept of ‘prescribing’ lifestyle advice and are happy to issue it to patients with health harming behaviours in a prescriptive manner.

More scripts were used in the clinic setting than the ward in secondary care. Likewise, more scripts were issued in primary care. This may reflect the L suitability in a desk-based consultation setting as opposed to use on the wards where practitioners are more mobile and may be preoccupied with many more tasks, patients and distractions. As the L is a prescription-based material with the intention of delivering lifestyle instruction and information, it may be more suitably applied to consultations where the patient is able to engage with the clinician in a private and more focussed environment as opposed to a busy ward setting. The L may be well suited for use in outpatient clinics run by consultants in this same manner.

The L can be viewed from a COM-B perspective, that is; capability, opportunity and motivation which are intertwined to formulate the behavioural outcome. Healthcare practitioners have the capability to deliver accurate and consistent lifestyle advice to their patients from an academic and empathetic perspective. They also have the opportunity to instigate behaviour change in their patients by providing a brief intervention during a consultation and giving lifestyle advice exploiting their valued position in society as healthcare professionals. There should also be a motivation for practitioners to give lifestyle advice taking into account the massively detrimental effect that health harming behaviours have upon patient’s health and the large proportion of the burden of disease as a direct result. Reducing the burden on the healthcare service is a benefit that cannot be overstated, it starts with prevention.

A benefit to this study was the good amount of heterogeneity in the participants as well as good heterogeneity in the patients in which the script was issued.

5.01 Clinician prompt

A predominant reason for the initial development of the L was that there currently existed no suitable, desk based, material tool that was useful for the patient in instigating behaviour change and also of benefit to the clinician in acting as a prompt or nudge for them to undertake a behaviour change conversation with their patients.

As the L was developed and commissioned by Public Health Wales, this was a key factor in its creation. It is an aim of Public Health to work towards making every consultation count (MECC) and the L was thought of as a tool which could potentially help clinicians' edge further towards this goal.

Naturally, for this to be able to take place, clinicians must see value in the tool itself, be comfortable with using it and be content for it to take a place on their desk. If the L is not placed in view on a clinician's desk then its purpose becomes basically defunct.

The results from the questionnaire were generally positive about the use of the L. the L appeared to be especially valued by nurses and healthcare assistant according to both the free text comments of the questionnaire and also the Likert scale results.

5.02 Use of L by doctors and nurses plus healthcare assistants

As nurses were more likely to report positively about the L it is speculated that this may in part be due to the increased availability of time which they may have in their consultations with patients(Jallinoja et al., 2007). The nurses recruited into this study were also specialised, including heart failure nurses, cardiac rehabilitation nurses and general nurse practitioners. Not only may these nurses have more time to dedicate to the issue of lifestyle advice but it is a common part of their daily consultations with patients and they are often more trained than doctors for this purpose.

5.1 Limitations of the L

5.11 Medicalisation

It could be said that the L *medicalises* behaviour change while also medicalising the solution to a patient's health harming behaviours. Medicalisation in the sense that the advice is being issued in a prescriptive and perhaps authoritarian manner. Nevertheless, taking the success of the GRx into account, this may be an effective mechanism of action for changing behaviour

in specific patient groups. It is known that healthcare professionals instructions are viewed differently by the different societal strata. People of lower socio-economic class with low levels of health literacy may benefit most from an instructionalist paradigm of health promotion (Yin *et al.* 2012). A negative aspect of *prescribing* lifestyle advice could be the perception of medicalisation of lifestyle guidance rather than viewing it as a counselling methodology.

However, if the predominant target of lifestyle advice is to those of low socioeconomic class with low health literacy but also an environment which promotes health harming behaviour, medicalisation may have a small effect on changing behaviour. Furthermore, those of low socioeconomic class often reside in areas where there are fewer opportunities to purchase high quality produce or engage in physical pursuits (Handy *et al.* 2002).

5.12 Advice

The L is simply advice. It is advice issued in prescriptive form and printed on a leaflet. However, the way the advice is issued to the patient, verbally, is equally as important as the format in which the patient takes it away (Brobeck *et al.* 2014). It may be necessary that all clinicians who utilise an L are appropriately trained in the motivational interviewing technique to enable them to best convey behaviour change information to patients and to have better success (Lee *et al.* 2016).

5.13 Personalisation

The L lacks any kind of personalisation which is unusual in the changing world of medicine becoming increasingly personalised. It is also paradoxical that the L is based on a prescription form but is then not personalised to the patient. Personalised medicine has shown to be more successful and this may be applied to changing behaviour. The L does not enable a patient to receive access to any sort of behaviour change treatment, it does signpost to services that can help. However, the patient has to take responsibility for this and must initiate contact. This may work for patients with high levels of self-efficacy and high motivation but may not work for those without or other perceived psychological barriers.

5.14 Paternalistic

One participant in the primary care arm of the study remarked that he found the L to be ‘paternalistic’ and felt uncomfortable issuing many. This may be because of the medicalisation aspect of giving simply lifestyle advice or, as other participants reported, that having the patient

sign the script when prescribed is an unusual methodology (Brandling & House 2009). Perhaps the L in its current format could be seen as taking the humanity out of a consultation between the patient and clinician.

The format of the L is also quite different to the general stance of today's health service when it comes to generating treatments with a patient. In the current health service and certainly in primary care, treatments are tailored to the individual need considering the patient's personal psychosocial health requirements whilst acknowledging their explicit health needs. Thus, the L takes a different view on how treat patients afflicted with health harming behaviours and works on a historical healthcare model, one that is more authoritarian and contractual than autonomous and individualised.

5.15 Goal oriented

The L is not designed to be a goal-oriented instrument for the patient. Goal oriented behaviour change has been found to be some of the most successful types of behaviour change techniques available (Michie *et al.* 2005). It is not certain where the L fits into the behaviour change taxonomy developed by Michie et al. It may be that the LR does not actually fit into the current model of behaviour change taxonomy because it is not fundamentally for the patient. It appears that the L is in fact designed with the clinician in mind and in a sense, aims to change the clinician's behaviour as far as it can promote the clinician conversing with the patient about health harming behaviours. In this regard the L is still a tool designed to change behaviour, but perhaps not that of the patient but the consulting clinician.

5.16 Dependent on practitioner 'buy in'

Taking the former points into account, the L will only be a successful tool if it is appreciated by the clinician enough to warrant its place upon the desktop and also for the clinician to feel the information contained within the script is of value to the patient.

If the tool is seen as having value to the clinician in that it provides an easier route of conveying lifestyle advice; it reduces the burden of having to spend much time communicating to the patient the value of changing behaviour; or it minimalises the mass of paperwork in leaflet form required to direct patients to community services, then it may be successful at attracting the clinician to its use.

If the L achieves this for the clinician, then it has fulfilled its primary duty and in theory should promote more behaviour change conversations taking place in the consultation room.

5.17 Population approach to behaviour change

The underlying message of the L to the primary or secondary healthcare provider is that it is their duty to give lifestyle advice to patients and to aim to initiate behaviour change. However, it is not clear that doing so will cause behaviour change to take place (Elwell *et al.* 2013). Furthermore, general practitioners have expressed concern for adopting a population approach to behaviour change. A main concern being the possible detrimental effects on the doctor-patient relationship of providing lifestyle advice to all patients (Lawlor *et al.* 2000).

5.2 Limitations of the study

A limitation to this study was the small sample size of participants. The main reason being that the study was based in a single Welsh health board and recruitment of clinicians was difficult and logistically awkward. It was envisaged that the study could move into the Cardiff and Vale health board to increase participants numbers whilst also taking into account the different demographic characteristics which exist in this health board compared to the CTUHB. In hindsight, the study itself should have run for longer to enable participants to have more time with the L script. A number of participants said they did not feel they had enough time in the study to prescribe the L and get a good feel for the use of the L. However, it could be speculated that this maybe a reflection of practitioners feeling many patients were unsuitable to receive the script therefore they didn't have enough time to find suitable patients. It is also possible that practitioners used lack of time as a cover up reason for not prescribing the L, they may have felt that it wasn't suitable for their patient or they may have lacked the confidence to use it. Nevertheless, the majority of participants reported feeling confident in giving lifestyle advice to patients and most said that prior to the study they had frequently given lifestyle advice. Only one hospital was trialled in delivering the L but this hospital serves a wide range of social demographics including the lower socio-economic class of the South Wales Valleys. There was no control group in this study as this was not suitable due to the methodology of testing the L. The study did not assess whether or not a material tool such as the L was useful in promoting the likelihood of the clinician engaging patients in behaviour change which should certainly be a critical assessment point if there is to be continued research and development of this tool.

Another limitation discussed at length during the viva voce for this MRes was the use of the survey and Likert scale to answer the research question. In hindsight, more appropriate methods for qualitative assessment would have included interviews and/or focus groups for to analyse perceptions of the LRx. However, as discussed at the viva, time and resources

made this unfeasible. Nevertheless, for future research into the LRx this must be considered.

6.0 Conclusion

The findings from this study indicate that some clinicians may find an L□ useful in aiding their usual verbal advice to patients with health harming behaviours. From a COM-B perspective the L□ provides the practitioner the capability to give reasonable and up-to-date advice regarding health harming behaviours as well as signposting the patient to useful services that can continue to engage them in changing their behaviour. This may be enough in itself to justify the use of the L□ as it could save time in distributing important up-to-date information to patients as well as reduce the number of resources needed to be dedicated to lifestyle guidance. The L□'s clear and compact format make it suitable to be distributed in many healthcare settings.

The L□ may be viewed as being a glorified leaflet. In many ways this presumption would be correct. The L□ does contain a novel method of 'solidifying' advice to the patient via the co-signing feature but this may be seen as a potentially unnecessary to the patient or worse disconcerting. The L□ at its most fundamental is a material which simply outlines several services which a patient is able to contact if they so choose to aid them in changing their health harming behaviours. It does this and no more. Yet, for all the L□ lacks in usefulness, it may make up for if it is suitably able to increase the likelihood of clinicians engaging patients in a behaviour change conversation.

The L□ must be trialled on a patient group in a randomised setting to determine whether patients would follow up on the advice issued to them via the medium of this novel prescription. It should also be determined if the presence of the L□ in the clinician's consultation increases their likelihood of undertaking a behaviour change conversation.

7.0 Future Direction

The L is similar to the New Zealand initiative of 'Green Prescribing' but different in its mechanism of action (Clay 2001). Green prescriptions (GRx) were developed for use in the New Zealand primary care setting and are managed by the New Zealand ministry of health. The GRx has suitably capitalised on the power of the prescription format, which has respect from patients and is valued. Patients also see prescription forms as serious written orders from a clinician. Therefore, the prescription format is a powerful medium to convey lifestyle change advice to patients. The L is similar in this fashion as it also utilises the prescriptive methodology. However, where the GRx links patients to services that will help them on their behaviour change journey, the L simply gives patients information, not unlike a simple leaflet one would pick up from a general practice reception, and then leaves the patient to their own devices. It is unknown whether this would lead to effective and lasting behaviour change, or even if it will lead to a behaviour change attempt (Coulter & Ellins 2007).

Therefore, I recommend that the L move towards a framework analogous to the New Zealand GRx. This method of function would suitably enable the prescribing clinician to track the patients behaviour change progress in their lifestyle modifications. There may potential for the L to be attached to the Welsh National Exercise Referral Scheme (NERS) ("National Exercise Referral Scheme (NERS) - WLGA" n.d.) and to expand on the limitations of this scheme at present to provide a more holistic behaviour change service. The NERS scheme has secured funding from the Welsh Government until March 2019 therefore there may be scope to design a behaviour change programme with broader horizons than the current model.

It is necessary to assess whether material tools such as the L are able to influence the likelihood of medical practitioners having behaviour change conversations with patients regarding lifestyle behaviours. The key to the L having any effectiveness is it's use by the prescribing clinician. Therefore, the foremost behaviour change lies with the prescriber. I found no suitable literature which attests to the usefulness of any material tool in helping to improve the likelihood of behaviour change conversations taking place. I believe this area of research to be lucrative in determining what is useful in a behaviour change context.

Evidence suggests that brief interventions are useful in changing patient behaviour. Taking this into account, increasing the amount of such conversations/ interventions taking place the greater number of successful behaviour change attempts will happen thus reducing the amount of health harming behaviour in the population.

The L may be developed further with the social prescribing model in mind (Brandling & House 2009). The concept of co-signing could be useful in engaging patients to actively engage with

social prescriptions including community engagement, exercise classes or even breastfeeding clubs for young mothers in socially deprived areas, like Cwm Taf. However, it isn't known how successful such 'social contacts' would be even with the co-signing of prescriber and patient in place. I believe care should also be taken to avoid "parternalising" or medicalising every aspect of someone's life because of their social class. Nevertheless, the ideas may warrant exploration.

As this study found that nurses adapted to the use of the L more successfully than many of the doctors it may be useful to develop nurse specific and doctor specific L. It would be important to find out the differences that these groups would appreciate in the L form itself and if they would utilise it differently. Nurses may appreciate the L as it is a tool which they can 'prescribe' and thus express more authority to the patient whilst still not having to take responsibility for pharmacological prescriptions which requires greater responsibility.

Naturally, a crucial next step in the development of the L is attaining feedback from patients on the concept and usefulness of the script from the patient point of view. The result of this feedback would of course determine the L future development.

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9.0 Appendix

9.1 Public Health Australia Conference

As I was privileged to be able to attend the national conference for the Public Health Association of Australia in Cairns, Australia September 26th to 28th I am dedicating a chapter in this dissertation to briefly compare and contrast the health inequities that exist in Wales and Australia and the impact of these inequities on cardiovascular morbidity. A researcher and clinician whom I very much admire, Sir Professor Michael Marmot has written extensively about these matters and has worked across many disciplines relating to the social determinants of health. Prof Marmot is British born but moved to Sydney when young and was educated their and later in California. Reading his book 'The Health Gap' just before I commenced this MRes really enthused me about Public Health and made me feel like action needed to be taken. It was by chance that I found this MRes which was well suited to my newfound interest in health inequality and public health.

I was fortunate to attend a talk by Prof Marmot held in Cardiff shortly after commencing my MRes. The talk he gave was motivating and positive. I became aware that there is much that we can do as a society to make things fairer and thus improve health for everyone.

Australia and Wales have some similarities in their population demographics with both countries having large populations of white Caucasians and both of these populations stemming from the British Isles. However, there are stark contrasts as Australia's population is approximately 25,088,296 as of September 30th 2018 (Australian Bureau of Statistics, 2018) and the population of Wales, UK is estimated to be 3,125,000 as of the 30th June 2017 (The Welsh Government, 2017b). Furthermore, Australia has since the 1950s seen many different waves of immigration from various other countries other than the British Isles. Predominantly, Italy, Greece, India, China, Vietnam, Korea and Indonesia. The Asian migrations have been more recent due to the infamous 'White Australia' Policy that the government had in place until just a few decades ago. As well as this, Australia was home to its indigenous peoples for around 60,000 years before the British landed on its shores in Botany Bay in 1788.

The Health care provided in Australia is some of the best in the world and Australians also have some of the best health in the world, including the 4th highest life expectancy for males and females combined, the UK is 20th according to the World Health Organisation. Medicare is the public arm of the healthcare provision to which all Australian permanent residents and

citizens, and some other groups, are entitled to. However, most Australians also take out private health insurance and this is actually encouraged by the Government as some services are not free, such as transport by Ambulance.

The indigenous people of Australia experience the most disparate health compared to the rest of the Australian population. They suffer from very high rates of cardiovascular disease, diabetes and other metabolic conditions. The health of those indigenous people whom live in the rural parts of Australia suffer the most. Accordingly, the indigenous population have high rates of unemployment and many social problems such as alcoholism, drug use and other addictions such as gambling. These problems are historical and can easily be traced back to the destruction of the aboriginal culture and way of life and their systematic subjugation and forced assimilation by the Caucasian population. Since the times of aboriginal community destruction, the health of the aboriginal people has drastically deteriorated. It is not simply that this race of people have worse health than others. There is no evidence to say that the health of aboriginal people was dire before colonisation. It is clear that colonisation leading to the most brutal inequality served to rack the health of these people.

To compare to the health of the people residing in Merthyr Tydfil and Rhondda Cynon Taf served by the CTUHB to aboriginal people in Australia may seem ludicrous on first inspection but is logical when explored. The health of those in this part of the Welsh Valleys is the worst in all of Wales, with high rates of cardiovascular disease and diabetes. Likewise, this part of Wales suffers from high rates of unemployment and social problems including addiction.

The reasons for the inequality that have been experienced by the Welsh and by the indigenous people of Australia are also similar. Both these people experienced the attempted eradication of their culture by the British (English in the case of the Welsh). Both were forced to speak only English and not use their native languages. Both had their home lands exploited and used for financial gain. Granted, the history of interaction between English peoples and Welsh peoples stretches further back, but it seems apparent that due to recent history and the economic policies imposed on Wales by an English government, they have suffered.

The inequality and dire health experienced by people particularly in the Welsh valleys stems from the destruction of their industry without any particular concern to the after effects of its dismantling. This area of Wales was economically dependent on the mining industry, which had many issues but was nevertheless the crux of life in this area. Policies enacted primarily by the Thatcher government saw to the end of this way of life for these people and can be viewed historically as having no regard to the outcome of this. Since that time, the valleys

have struggled to recover, and we can see today the effects on the people's health and the generational link.

I could write at length of the similarities between the indigenous peoples suffering and those of the Welsh residing in the Welsh valleys. What it comes down to is clear and well elucidated by Michael Marmot. Inequality kills. Inequality causes unnecessary suffering. The effects of inequality travel down generations and thus cause suffering even to the unborn. It is wicked.

I feel I should add to this chapter that I do not believe that something such as a lifestyle prescription form (LRx) would be much use in the circumstances of improving aboriginal health in Australia. In fact, that would seem a very simplistic approach to such a convoluted problem entangled in culture and social circumstances. I suppose, if I do not think that the LRx would be of much use in aboriginal communities, then why should I believe it would be of use in communities of markedly disparate health in Wales.

9.2 Conference Report

Introduction

The Public Health Association of Australia (PHAA) is recognised as the principal non-government organisation for public health in Australia and works to promote the health and well-being of all Australians. The Association seeks better population health outcomes based on prevention, the social determinants of health and equity principles. (Extract taken from the PHAA website, a good summary of what the organisation is).

I was very fortunate to attend the national Public Health Association of Australia's annual conference in Cairns, Queensland, Australia in September 2018. I was able to attend this conference due to the generous stiped budget from my KESS 2 scholarship from the University of South Wales, UK (not the University of New South Wales, Aus, which frequently confused my new acquaintances).

The conference was a 3-day event held at the Pullman hotel in Cairns and was a large event with delegates coming from all over Australia. I didn't meet anyone else that had flown in from abroad for the conference, but many people were from different nations and were now working or studying in Australia, so the conference had a multinational feel to it and everyone was there because of their passion for Public Health.

Overall, the main theme was leadership in Public Health, but I found that to be a bit vague and not very clear as to what some speakers were calling for other than simply more leadership – I left some talks wanting a more concrete call to action. However, other big points that were covered concerned climate change and aboriginal health. I found these to be far more interesting and well-defined topics.

Day 1.

The main theme for this year's conference was leadership in public health. Therefore, it was apt that one of the speakers for the opening plenary was a retired Australian Navy admiral who had since set up a PTSD charity for New Zealand and Australian veterans. His aim with the charity was to connect existing organisations dotted around Australia and New Zealand to provide better care for ex-servicemen and women. Another speaker in the opening plenary was Dr Linda Selvey who had a very interesting background including having been the CEO

of Greenpeace from 05 to 11. Dr Selvey was also a medical doctor and moved into public health. The overarching narrative in the opening plenary was the call for greater leadership in the Public Health community. Mrs Jeanie Beatie spoke about the importance of aboriginal leadership in their own communities and having the autonomy to make their own decisions for their own wellbeing.

I noted early on in the conference that before anyone gave a talk or presentation they would pay respect to the original owners of the land and acknowledge their elders past and present. As well as this there was a ‘Welcome to Country’ talk given which I was told ‘is protocol’ and is the done thing when people visit different parts of aboriginal land in Australia.

The second plenary after lunch consisted of talks from PhD students involved in research to do with aboriginal culture and the importance of this in determining health. A comparison was made between those aboriginal 'rangers' who were regularly out 'in country' and those that were not rangers. it was found that rangers had better health outcomes than did non-rangers. The speculated reason for this was that rangers were more in touch with their culture by being out on country and were experiencing a life more similar to their ancestors. I suppose that being a ranger would mean a more active lifestyle and potentially better social circumstances including having employment and connections with people around them, so I would presume this has an impact on health too. Nevertheless, data presented shows that rangers actually had higher rates of smoking and alcohol use but still had better health than non-rangers.

In this plenary a video talk was given by doctor Mark Wenitong who talked at length about the importance of recognising the work of aboriginal 'healers' as crucial for the health of these people. Though he was a medical doctor trained in the western method, he was of aboriginal descent and thus was able to see the importance of the healers through both the western and aboriginal lens. He insisted that the work of the healers was necessary as it took a more holistic approach to heath whereas western medicine concentrated on the reductionist method.

I spent the afternoon in my choice of session. I chose to go to the table top presentations which consisted of researchers moving around the room to present to the people of the table. I was particularly interested by a piece of research into the abortion rates of different states and how there were huge increases in states which allowed abortion at their borders as women were crossing state lines to have access to abortion. It had been found that abortion was difficult for rural women to access and of course aboriginals were disproportionately affected.

Day 2.

The day 2 morning plenary was along the theme of climate change and its relation to public health. There was an emphasis placed on how public health officials have a role to play in the changing climate. The first talk given by professor was enlightening and reminiscent of a TED talk in its style. it was enthusing to watch and listen to and I enjoyed observing the presentation of the data. Although it was realistic about the struggle humanity faced regarding climate change, there was a sense that we can still act and produce change if we act with rapidity.

It was reflected that public health professionals had a duty to be part of government policy decisions due to the great impact that climate change is having and will have on human health. Particularly in those areas that are experiencing the greatest changes such as sea level rises, droughts and intense heat. This will obviously affect Australia therefore there is a consensus that change needs to happen fast.

The talks easily took on a melancholy disposition but became more upbeat towards the end when it was elucidated the great amount of change already taking place in the renewable sectors and also the policy changed which are already being implemented.

I spent the afternoon in a long presentation and then discussion given on falls and using exercise physiologists in care homes. I am unaware of the use of exercise physiologists in care homes in the UK. I would speculate that we do not use them as it is a novel approach in Australia. The care home using exercise physiologists were seeing excellent results and thus the speakers were hoping to widen the use of exercise physiologists in other care homes.

Day 3.

For the final day of the conference I was very privileged to have the opportunity to visit an indigenous community in North Queenslaand, the Yarrabah community. The trip to the Yarrabah community was an insightful look into how the determinants of health are being tackled by the local community.

The trip focussed on learning about what health leaders were doing in the community to tackle the large disparities in health that the community faced. We were greeted by a local health contact and given an introduction by prominent leaders of the community who informed us of the main issues which they faced. In reality the issues were not dissimilar from those faced in

the Cwm Taf University Health Board including cardiovascular disease, high rates of obesity and diabetes and many of the associated social problems, drug dependency, alcoholism, gambling and crime. In contrast however, the rate of unemployment for the Yarrbah (60% unemployed) was significantly greater than for the residents of the Welsh Valleys (although they too have suffered from high levels of unemployment compared to the UK or even Welsh average).

Although it may seem a large leap to be comparing an area of the incredibly influential and affluent United Kingdom to a community of indigenous people in Australia I would attest that the issues faced by these communities differ by degree but not by kind. In fact, from my reading and experience it is a similar story the world over. Populations that experience subjugating or exploitation at some point in their history take decades to recover and are still left behind economically. This turns once thriving communities into groups of people highly dependent on state government and it absolutely destroys their health. It is also highly degrading to the people concerned. Furthermore, it isn't very good for the country or population which took advantage in the first place as they then become destined to take care of a struggling population that cannot economically self-sustain or contribute much to the country they reside in.

There are then parallels to the strife of the indigenous and those of the welsh valleys. Clearly both have been exploited, interestingly both exploited by the British and both in very recent history. Also, of interest to me, and I think of relevance, is that both of these peoples have an extremely strong sense of identity, in that they identify passionately as a group and they rally around their culture. The welsh are famously patriotic and from what I saw of the indigenous people in Australia they are making great effort to safeguard their culture which they describe as being stolen from them. In fact, the 'stolen generation' is what this is partly referring to where aboriginal children were forcibly taken from their homes and made to assimilate into white culture. Likewise, the welsh people were forced to speak English and forbidden from speaking their native language of Welsh.

It seems clear to me that the parallels which exist between the poor areas of Wales and the aboriginal communities in Australia are largely due to inequality and thus the shared major social determinants of health.

I left the conference with a renewed determination to work in this sector to improve health for all.

9.3 P-PLAC participant information sheet

See folder

9.4 S-PLAC participant information sheet

See folder

9.5 P-PLAC consent form

See folder

9.6 S-PLAC consent form

See folder

9.7 Proposal

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9.8 S-PLAC survey

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9.9 P-PLAC survey

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9.10 L Conference poster for National Public Health Australia Conference in Cairns 2018

BE MORE ACTIVE | LOW OR NO ALCOHOL

Introducing a novel cardiovascular lifestyle prescription form (LRx) in the primary and secondary care setting with qualitative feedback

Samuel Cornell[1], Prof Mark Williams[2], Mr Ashley Gould[3], Dr Gethin Ellis[4]
University of South Wales [1,2], Public Health Wales[3], Royal Glamorgan Hospital[4]

EAT HEALTHILY | STOP SMOKING

Four behavioural choices - cigarette smoking, excessive alcohol consumption, lack of exercise and an unhealthy diet (high in sugar) are leading contributors of up to 50% of the burden of disease in Wales, UK.

- Lifestyle choices may cause up to **90%** of all cardiovascular mortality.
- Patients **expect** to be asked about their health behaviours.
- Prescription forms are valued by patients

Methods and Aims:
37 primary and secondary clinicians (varied specialties) were recruited to partake and dispense up to 20 LRx during their consultations. LRx distribution was recorded and demographic data collected. Participants completed a survey after a one month period. The aim was to gather clinician's opinions on the feasibility of use of the LRx in the clinical setting.

Figure 1. Front of the LRx showing the modified prescription form alongside instructions for the four main lifestyle changes.

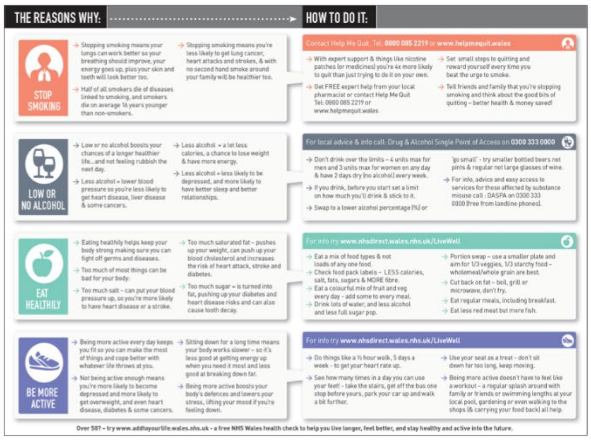

Figure 2. Back of the LRx showing advice on how to change and services (in Wales, UK) which can help.

Quantitative results: Forty percent (196 of 480) of the LRx scripts that were provided to primary and secondary care clinicians during the study period were issued (age (mean) 56 years, range 35-75 years). In most consultations the LRx was prescribed for dietary advice, 69 and 62% in primary and secondary care respectively. The LRx was prescribed as an adjunct to prescribing medication (43%) and in response to request for advice from the patient (40%). Nurses were significantly more likely to prescribe an LRx in response to a request for advice from a patient. In secondary care, more LRx were prescribed to males than females (p = 0.017).

Qualitative clinician feedback:
"Patients seemed to respond to the quit smoking aspect of the lifestyle prescription form. It gave them more confidence to go into a pharmacy and ask for help."

"I thought the script was a good way to enable patients to make decisions about their own health and to consider making changes. It was accepted well as given reasons for change and how they could get support"

The greatest barrier to use was found to be "lack of time" which is a common complaint amongst clinicians when speaking of behaviour change engagement.

Cronfa Gymdeithasol Ewrop European Social Fund
Llywodraeth Cymru Welsh Government
kess2 Ysgolorsiaethau Sgiliau Economi Gwybodaeth Knowledge Economy Skills Scholarships
University of South Wales
Knowledge Economy Skills Scholarships (KESS) is a pan-Wales higher level skills initiative led by Bangor University on behalf of the HE sector in Wales. It is part funded by the Welsh Government's European Social Fund (ESF) convergence programme for West Wales and the Valleys.

Note: 37 participants were recruited with 1 drop out.

9.15 The KESS Programme

The KESS 2 (Knowledge Economy Skills Scholarship) programme provided me with the opportunity to undertake a fully funded Master of Research programme. The programme is unique in academia due to its fundamental link between academia and industry. However, in the case of this specific project the link was with a public body.

An aspect to the programme which I found to be very rewarding is its emphasis on developing oneself professional and thus using the programme as much as possible to this end. The KESS 2 'Grad School', a three-day residential, provided the opportunity to network with other KESS candidates and to learn about the opportunities which are present outside of academia in the world of business or consulting.

Whilst enrolled on this KESS programme I was also fortunate to be selected to attend a Welsh Government funded 'Bootcamp to Business' programme to expand my knowledge of business related skills. This was also a fantastic experience and tied in well with the overarching aims of the KESS programme.

I enjoyed attending conferences whilst conducting my masters including a Public Health Wales Research and Development conference in Cardiff where I presented a poster. I was very fortunate to be granted funding by the Welsh European Funding Office to attend the Public Health Association of Australia annual national conference in Cairns, Australia in September 2018.

All in all, KESS enabled me to have a very productive and fulfilling year with ample funding for personal and professional development which would most likely have been unattainable on a self-funded master's programme elsewhere.

9.16 KESS Disclaimer

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